DOCUMENT RESUME

ED 106 121 SE 019 080

AUTHOR	Dickens, Charles H.
TITLE	Young and Senior Science and Engineering Faculty, 1974: Support, Research Participation, and Tenure.
INSTITUTION	National Science Foundation, Washington, D.C. Div. of Science Resources Studies.
REPORT NO	NSF-75-302
PUB DATE	Dec 74
NOTE	128p.
AVAILABLE FROM	Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 ($1.70)
EDRS PRICE	MF-$0.76 HC-$6.97 PLUS POSTAGE
DESCRIPTORS	Financial Support; *Higher Education; Research; *Research Directors; *Research Opportunities; Research Projects; Science Education; *Sciences; *Surveys
IDENTIFIERS	National Science Foundation; NSF

ABSTRACT

Presented are the results of a survey, initiated in mid-1974 by the National Science Foundation, to update the findings of a 1968 survey designed to obtain information on research activities of faculty in colleges and universities. Survey topics deal with faculty composition, tenure, proportion of faculty active in research, division of research support between young and senior staff, ability of researchers to secure support in research areas of their own choosing, and changes in time spent by faculty in classroom teaching. Although information reported came from department heads, information was requested for both young and senior investigators. The document's three appendices contain information on methodology, annotated statistical tables, and copies of survey instruments. (PEB)

ED106121

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

YOUNG AND SENIO
SCIENCE AND ENGI
FACULTY, 1974

Support, Research Participatio

nsf

NATIONAL SCIENCE FOUNDATION

SE 019 080

HEALTH,
ARE
E OF

EEN REPRO
EIVED FROM
TION ORIGIN
OR OPINIONS
ILY REPRE
NSTITUTE OF
OLICY

SE

YOUNG AND SENIOR SCIENCE AND ENGINEERING FACULTY, 1974

Support, Research Participation, and Tenure

NATIONAL SCIENCE FOUNDATION

2 3

Related Publications

REPORTS	NSF No.	Price
Federal Support to Universities, Colleges, and Selected Nonprofit Institutions, Fiscal Year 1973	75-303	In Press
Detailed Statistical Tables, Graduate Science Education: Student Support and Postdoctorals, Fall 1973	74-318-A	—
Graduate Science Education: Student Support and Postdoctorals, Fall 1972	73-315	$2.85
Impact of Changes in Federal Science Funding Patterns on Academic Institutions, 1968-70	70-48	$0.75
Support and Research Participation of Young and Senior Academic Staff, 1968	68-31	—

HIGHLIGHTS

"Graduate Enrollment Up in Biological Sciences, Fall 1974"	74-321	—
"Academic R&D Expenditures Up 9 Percent in 1973"	74-306	—

Availability of Publications

Those publications marked with a price should be obtained directly from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Where no price is listed, single copies may be obtained gratis from the National Science Foundation, Washington, D.C. 20550.

(See inside of back cover for Other Science Resources Publications.)

YOUNG AND SENIO SCIENCE AND ENGI FACULTY, 1974

Support, Research Participatio

NSF 75-302

NATIONAL SCIENCE FOUNDATION

YOUNG AND SENIOR SCIENCE AND ENGINEERING FACULTY, 1974

Support, Research Participation, and Tenure

NATIONAL SCIENCE FOUNDATION

For sale by the Superintendent of Documents, U.S. Government Printing Office Washington, D.C. 20402 - Price $1.70

FOREWORD

The National Science Foundation periodically conducts surveys to obtain information on research activities of faculty in colleges and universities. The last such survey was made in 1968. Since then, major changes have taken place in Federal and non-Federal funding of academic science. In order to obtain information on the current status of faculty research activity and to determine the changes that have occurred since 1968, the Foundation initiated the present survey in mid-1974. Replies were requested from heads of doctorate-level departments in 15 selected, typical science and engineering fields.

The survey topics deal with faculty composition, tenure, proportion of faculty active in research (both overall and directly connected with federally supported projects), division of research support between young and senior staff, ability of researchers to secure support in research areas of their own choosing, and changes in time spent by faculty in classroom teaching. For all items, information was requested for both young and senior investigators. The opinions reported are those of department heads, but it is believed that they generally reflect broad views based on concern for the overall welfare of departments and the various fields of science.

The Foundation is deeply appreciative of the high degree of response from department heads. The timeliness and completeness of their replies indicate the importance of the problems studied. It is expected that the summary of the opinions and factual data developed in the survey will assist in the formulation of Federal and non-Federal science policy.

Charles E. Falk
Director, Division of Science
Resources Studies

December 1974

acknowledgments

This report was developed in the Manpower Studies Section, Robert W. Cain, Head, within the Division of Science Resources Studies. Charles H. Dickens, Study Director, Science Education Studies Group, supervised the conduct of the survey and prepared the report. J. Hamilton Andrews assisted with survey operations data, editing, and data tabulations. Additional assistance was provided by Lola Edwards, Felix H. I. Lindsay, and Naomi Sulkin. Statistical assistance was provided by Vivian Englemann, Marjorie McMahan, Gayle Barker, James McLemore, and David Norland.

CONTENTS

Page

- Highlights vi
- Faculty Characteristics 1
  - Introduction 1
  - Overall faculty composition 1
  - Proportion of young doctorate faculty by field 2
  - Tenure 3
  - Research activity 4
  - Research connected with federally supported projects 5
  - Source of research funds 7
  - Appropriateness of split of research funds 7
  - Support in chosen research area 8
  - Participation in research projects at industrial and government laboratories 10
  - Change in time spent in classroom teaching 10
- Selected Characteristics of Science and Engineering Departments, 1973-74 11

Appendixes

- Appendix A. Methodology 16
- Appendix B. Annotated Statistical Tables 18
- Appendix C. Survey Instruments 56

LIST OF

1 Change in number of young doctora
level science and engineering depart

2 Percent of faculty spending 20 perce
in research for matched doctorate-le
engineering departments: 1968 and 1

3 Proportion of faculty investigators do
with Federal project grants and cont
senior to young doctorate investigat
science and engineering departments

4 Proportion of doctorate-level science
reporting that split of research funds
faculty is not appropriate, by field: 19

5 Proportion of doctorate-level science
indicating that faculty investigators g
secure support in research areas of t

6 Change in classroom teaching time o
doctorate-level science and engineeri

7 Selected characteristics of doctorate-
departments: 1973-74 ....

(See Appendix table A-1 for survey popu
doctorate-level science and engineering
graduate enrollment, by field).

Page
.... vi

.... 1
.... 1
.... 1
aculty by field 2
.... 3
.... 4
lly supported projects 5
.... 7
rch funds 7
a 8
s at industrial
.... 10
om teaching 10
nd
3-74 11

.... 16
al Tables 18
s 56

LIST OF TABLES

Page

1 Change in number of young doctorate faculty for matched doctorate-level science and engineering departments, by field: 1968-74 2

2 Percent of faculty spending 20 percent or more of their time in research for matched doctorate-level science and engineering departments: 1968 and 1974 4

3 Proportion of faculty investigators doing research connected with Federal project grants and contracts and ratio of senior to young doctorate investigators in doctorate-level science and engineering departments, by field: 1974 5

4 Proportion of doctorate-level science and engineering departments reporting that split of research funds for young doctorate faculty is not appropriate, by field: 1968-74 8

5 Proportion of doctorate-level science and engineering departments indicating that faculty investigators generally are able to secure support in research areas of their own choosing: 1974 8

6 Change in classroom teaching time of full-time faculty in doctorate-level science and engineering departments: 1968-74 10

7 Selected characteristics of doctorate-level science and engineering departments: 1973-74 11

(See Appendix table A-1 for survey population and respondents by number of doctorate-level science and engineering departments and fall 1973 full-time graduate enrollment, by field).

HIGHLIGHTS

- The overall proportion of young doctorate faculty in doctorate-level science and engineering departments has decreased from 39 percent of full-time faculty in 1968 to 28 percent in 1974. The proportion ranges by field from 18 percent for physics to 42 percent for sociology in the latter year. (Young doctorate faculty are those who have held doctorates for 7 years or less.)

- Fully 70 percent of the faculty in 1974 in these departments are tenured. In terms of individual fields, the proportion of tenured faculty ranges from 59 percent for physiology to 81 percent for chemical engineering.

- In 1974, about 84 percent of the full-time faculty in doctorate-level science and engineering departments are spending 20 percent or more of their time in research, with the proportion being even higher, 89 percent, for young doctorate faculty. This represents a slight increase over 1968. However, only about one-half of these researchers in 1974 are doing research directly connected with project grants and contracts awarded by Federal agencies, a proportion substantially below the nearly two-thirds 1968 level.

- The degree of faculty participation in research projects in industrial and government laboratories is low—about 3 percent for projects in industrial laboratories and 5 percent for projects in government laboratories. In the engineering disciplines, participation lies generally in the 10- to 15-percent range.

- Only about one-half (55 percen
faculty investigators—senior as
secure support in research areas
department heads classify the i
research areas of their own choo
other hand, choice of research
problem.

- More than three-fourths (78 p
science and engineering departn
ty are receiving an appropriate
Federal and non-Federal. This fi
veys.

- For slightly less than two-thirds o
ty in 1974 are spending about th
teaching as they did in 1970. Mos
creases of 10 percent or more

- In 1973-74 the average numbe
science and engineering departm
time graduate students is 49.
Mathematics departments have
full-time faculty, 37; those in ch
terms of average number of f
departments have the most, 80,
fewest, 17.

ung doctorate faculty in doctorate-level
tments has decreased from 39 percent of
ercent in 1974. The proportion ranges by
cs to 42 percent for sociology in the latter
are those who have held doctorates for 7

1974 in these departments are tenured. In
roportion of tenured faculty ranges from 59
ercent for chemical engineering.

full-time faculty in doctorate-level science
are spending 20 percent or more of their
portion being even higher, 89 percent, for
represents a slight increase over 1968.
of these researchers in 1974 are doing
ith project grants and contracts awarded
rtion substantially below the nearly two-

ation in research projects in industrial and
—about 3 percent for projects in industrial
projects in government laboratories. In the
pation lies generally in the 10- to 15-percent

- Only about one-half (55 percent) of the department heads report that faculty investigators—senior as well as junior—generally are able to secure support in research areas of their own choosing. Most of the other department heads classify the inability of faculty to secure support in research areas of their own choosing as a major problem. In 1968, on the other hand, choice of research areas was viewed as much less of a problem.
- More than three-fourths (78 percent) of the heads of doctorate-level science and engineering departments believe that young doctorate faculty are receiving an appropriate share of available research funds—both Federal and non-Federal. This finding is in accord with results of prior surveys.
- For slightly less than two-thirds of the departments, regular full-time faculty in 1974 are spending about the same proportion of time in classroom teaching as they did in 1970. Most of the remaining departments report increases of 10 percent or more in classroom teaching time.
- In 1973-74 the average number of full-time faculty for doctorate-level science and engineering departments is 21 and the average number of full-time graduate students is 49. These figures vary greatly by field. Mathematics departments have, on the average, the largest number of full-time faculty, 37; those in chemical engineering, the fewest with 11. In terms of average number of full-time graduate students, psychology departments have the most, 80, while physiology departments have the fewest, 17.

FACULTY CHARACTERISTICS

Introduction

The primary focus of this study is the research activities of full-time science and engineering faculty in doctorate-granting colleges and universities.[1] Department heads were asked to provide information on the relative distribution of research activity and support between "young" and "senior" faculty, and on faculty composition, tenure status, and time spent in classroom teaching.

The status of younger faculty members in research activities is of special and continuing interest. In order to serve the need for this information, the survey made an arbitrary distinction between "young" and "senior" doctorate faculty. Those who received doctorates on or after July 1, 1967, are considered to be in the "young" category. The remaining doctorate faculty are considered "senior" doctorate faculty. Information on faculty without doctorates was also requested for some items of the survey, but no distinction between "young" and "senior" faculty is made for this group. All faculty spending 20 percent or more of their time in research are designated as "investigators."

---

[1] The survey population consists of 160 doctorate-granting institutions which awarded at least one doctorate in a science or engineering field in 1970-71 and which received at least $1 million in Federal obligations for research and development in fiscal year 1972. Within these institutions, the survey covers doctorate-level departments in 15 fields: Biochemistry, biology, botany, chemical engineering, chemistry, economics, electrical engineering, geology, mathematics, microbiology, physics, physiology, psychology, sociology, and zoology.

Overall Faculty Compositio

In 1974, senior doctorate faculty a
percent) of those in the 1,366 respondin
than 3 out of 10 full-time faculty (28.2
group, and only a small minority, 4.0 p
torates (appendix table B-1).

There are only slight differences b
with respect to faculty composition.
proportion of young doctorate faculty is
B-3). The departments rated "disting
Andersen study[2] have the lowest prop
percent, followed closely, with 25.9 pe
each field in terms of fall 1973 full-time g
4 and B-5).

Between 1968 and 1974, the prop
doctorate-level science and engineerin
dropping from 39.2 percent to 27.4
departments included in both surveys.
torates also decreased from 7.0 percen
period, there was an overall increase of
time faculty in these 602 departments.
increase of 39.5 percent in the number
tables B-6 and B-7).

---

[2] Kenneth D. Roose and Charles J. Andersen. A
American Council on Education), 1970.

ERISTICS

is the research activities of full-time
ctorate-granting colleges and univer-
to provide information on the relative
upport between "young" and "senior"
, tenure status, and time spent in

nbers in research activities is of special
e the need for this information, the sur-
ween "young" and "senior" doctorate
tes on or after July 1, 1967, are con-
. The remaining doctorate faculty are
. Information on faculty without doc-
items of the survey, but no distinction
s made for this group. All faculty spend-
time in research are designated as

-granting institutions which awarded at least one doc-
hich received at least $1 million in Federal obligations
ithin these institutions, the survey covers doctorate-
botany, chemical engineering, chemistry, economics,
biology, physics, physiology, psychology, sociology,

Overall Faculty Composition

In 1974, senior doctorate faculty account for more than two-thirds (67.8 percent) of those in the 1,366 responding doctorate-level departments. Fewer than 3 out of 10 full-time faculty (28.2 percent) are in the young doctorate group, and only a small minority, 4.0 percent, of the faculty do not hold doctorates (appendix table B-1).

There are only slight differences between public and private institutions with respect to faculty composition. For both groups of institutions the proportion of young doctorate faculty is 28.2 percent (appendix tables B-2 and B-3). The departments rated "distinguished" or "strong" in the Roose-Andersen study[2] have the lowest proportion of young doctorate faculty, 25.2 percent, followed closely, with 25.9 percent, by the 20 largest departments in each field in terms of fall 1973 full-time graduate enrollment (appendix tables B-4 and B-5).

Between 1968 and 1974, the proportion of young doctorate faculty in doctorate-level science and engineering departments declined substantially, dropping from 39.2 percent to 27.4 percent of total faculty in the 602 departments included in both surveys. The proportion of faculty without doctorates also decreased from 7.0 percent to 3.4 percent. Yet, during this 6-year period, there was an overall increase of about 8.4 percent in the number of full-time faculty in these 602 departments. The resultant of all the changes was an increase of 39.5 percent in the number of senior doctorate faculty (appendix tables B-6 and B-7).

---

[2] Kenneth D. Roose and Charles J. Andersen. *A Rating of Graduate Programs*. (Washington, D.C.: American Council on Education), 1970.

DISCUSSION

The overall composition of faculty in doctorate-level science and engineering departments during the sixties was strongly influenced by the rapid gains in enrollment that characterized that decade. From fall 1960 to fall 1967, total degree-credit enrollment in higher education increased by 78.8 percent and enrollment for advanced degrees in science and engineering fields increased by 86.1 percent. In addition, from academic years 1959-60 to 1966-67, the number of doctorates awarded in science and engineering fields increased by 110.7 percent. Thus, it was possible for departmental faculties to meet the challenges of greater enrollment, in large part by hiring new doctorates.[3]

In 1968, as stated above, for the 602 departments included in both NSF surveys, the proportion of young doctorate faculty stood at 39.2 percent. The age distribution of faculty in these departments probably did not differ greatly from that reported by an American Council on Education study for 1969, which found that 5.8 percent of the science and engineering faculty in doctorate-granting institutions were over age 60.[4] It would appear that only a small fraction of the faculty could attain retirement age by 1974.

In 1968 the 602 departments reported 5,535 young doctorate faculty. Each following year a number of these faculty moved into the senior doctorate category, because by then they have held their doctorates for more than seven years. If one assumes that in 1968 there were equal numbers of young faculty who held doctorates for one year, two years, etc., one would find that by 1974, six years later, six-sevenths of the starting group of 5,535 young doctorates, or about 4,750, would have moved to the senior doctorate category. The number of senior doctorate faculty reported in 1974 is 2,999 more than in 1968. Under reasonable sets of assumptions about retirements, changes to nonacademic positions, deaths, etc., for both young and senior doctorate faculty during the 1968-74 period, it is doubtful that all the young doctorate faculty of 1968 could have been retained.

---

[3] U.S. Office of Education, *Fall Enrollment in Higher Education, Enrollment for Advanced Degrees,* and *Earned Degrees Conferred,* three annual series (Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office).

[4] Unpublished tabulations from Alan E. Bayer, "College and University Faculty: A Statistical Description," *ACE Research Reports* 5,5 (Washington, D.C.: American Council on Education), 1970.

Proportion of Young Doct

The proportion of young doctora
ranging from 42.4 percent for sociolog
with 1968 data for the 12 fields comm
tions of young doctorate faculty relati
(appendix tables B-6 and B-7). When
faculty reported for the two surveys a
three fields are found to have increa
(table 1).

Table 1. Change
doctorate fac
doctorate-level sci
departments,

Field
12 selected fields ....
Biochemistry ....
Biology ....
Chemical engineering ...
Chemistry ....
Economics ....
Electrical engineering ...
Mathematics ....
Microbiology ....
Physics ....
Physiology ....
Psychology ....
Sociology ....

Source: National Science Fo

CUSSION

faculty in doctorate-level science and
e sixties was strongly influenced by the
cterized that decade. From fall 1960 to fall
in higher education increased by 78.8 per-
egrees in science and engineering fields in-
from academic years 1959-60 to 1966-67,
n science and engineering fields increased
ble for departmental faculties to meet the
large part by hiring new doctorates.[3]

e 602 departments included in both NSF
ctorate faculty stood at 39.2 percent. The
epartments probably did not differ greatly
n Council on Education study for 1969,
the science and engineering faculty in
over age 60.[4] It would appear that only a
ttain retirement age by 1974.

reported 5,535 young doctorate faculty.
e faculty moved into the senior doctorate
held their doctorates for more than seven
ere were equal numbers of young faculty
o years, etc., one would find that by 1974,
rting group of 5,535 young doctorates, or
e senior doctorate category. The number
n 1974 is 2,999 more than in 1968. Under
ut retirements, changes to nonacademic
g and senior doctorate faculty during the
he young doctorate faculty of 1968 could

n *Higher Education, Enrollment for Advanced Degrees,*
ies (Washington, D.C. 20402: Supt. of Documents, U.S.

, "College and University Faculty: A Statistical Descrip-
D.C.: American Council on Education), 1970.

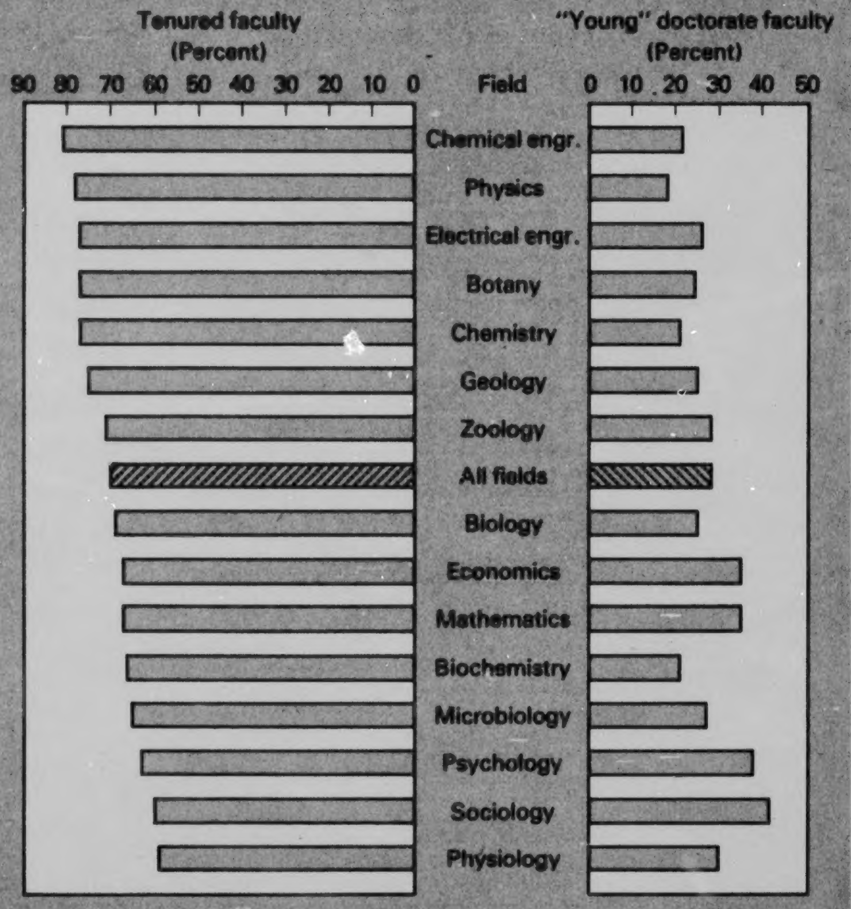
Proportion of Young Doctorate Faculty by Field

The proportion of young doctorate faculty in 1974 varies greatly by field, ranging from 42.4 percent for sociology to 18.2 percent for physics. Compared with 1968 data for the 12 fields common to both surveys, all the 1974 proportions of young doctorate faculty relative to other faculty groups show declines (appendix tables B-6 and B-7). When the actual numbers of young doctorate faculty reported for the two surveys are compared, however, departments in three fields are found to have increases: biology, psychology, and sociology (table 1).

Table 1. Change in number of young doctorate faculty for matched doctorate-level science and engineering departments, by field: 1968-74

Field	Number of departments	Percent change in number of young doctorate faculty, 1968-74
12 selected fields	602	-24.4
Biochemistry	31	-31.2
Biology	32	+ .9
Chemical engineering	52	-40.1
Chemistry	103	-34.7
Economics	45	-15.1
Electrical engineering	61	-43.8
Mathematics	69	-20.4
Microbiology	22	-17.8
Physics	77	-51.6
Physiology	18	-3.9
Psychology	58	+ 10.0
Sociology	34	+ 14.0

Source: National Science Foundation.



Selected characteristics of full-time faculty in doctorate-level science and engineering departments, by field, 1974

SOURCE: National Science Foundation

Tenure

Seven out of ten full-time science a
ing doctorate-level departments have t
ing is in accord with other observations
tion of faculty with tenure has increased
Council on Education study[5] found that
cent) of faculty in all fields were tenur
(46.7 percent) with tenure in 1968-69.

The proportion of tenured faculty i
covered by this study ranges from a high
ing down to 59.1 percent for physiolog
have a lower proportion, 65.2 percent,
institutions, 71.9 percent (appendix
departments rated by quality of gra
"strong" in the Roose-Andersen study[6]
each field in terms of fall 1973 full-time g
tenured faculty, 71.6 percent and 72.4 p
the average for all departments (appen

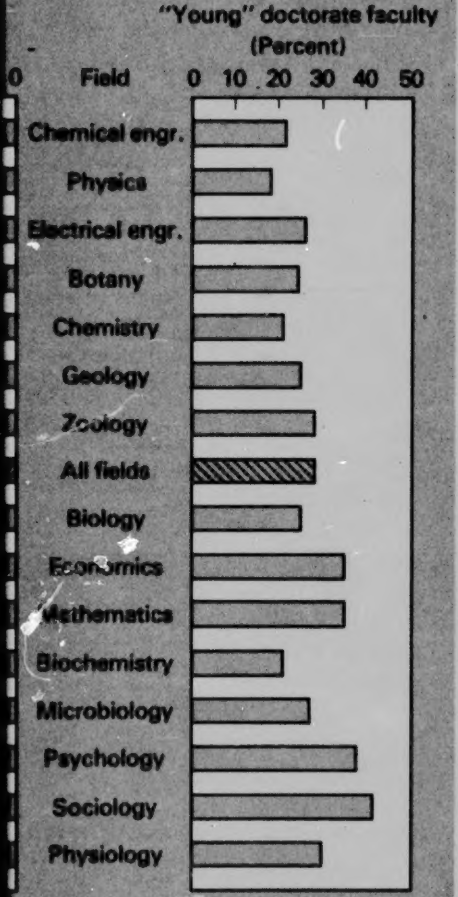
Overall, more than half of the fac
(54.4 percent), a fact suggesting that a
members for a number of years. Alth
without doctorates are in departments
engineering, mathematics, and soci
between fields in the proportion of thos
and mathematics, 83.8 percent and 68.
respectively, are tenured, compared t
percent in sociology (appendix tables

---

[5] Alan E. Bayer, "Teaching Faulty in Academe:
D.C.: American Council on Education), 1973.

[6] Roose and Andersen, *op. cit.*

full-time faculty in
engineering departments,



Tenure

Seven out of ten full-time science and engineering faculty in the responding doctorate-level departments have tenure (appendix table B-8). This finding is in accord with other observations. During the past few years the proportion of faculty with tenure has increased substantially in all fields. An American Council on Education study[5] found that in 1972-73 almost two-thirds (64.7 percent) of faculty in all fields were tenured, compared with less than one-half (46.7 percent) with tenure in 1968-69.

The proportion of tenured faculty in the 15 science and engineering fields covered by this study ranges from a high of 80.7 percent for chemical engineering down to 59.1 percent for physiology. Departments in private institutions have a lower proportion, 65.2 percent, of tenured faculty than those in public institutions, 71.9 percent (appendix tables B-9 and B-10). Both for departments rated by quality of graduate faculty as "distinguished" or "strong" in the Roose-Andersen study[6] and for the 20 largest departments in each field in terms of fall 1973 full-time graduate enrollment, the proportions of tenured faculty, 71.6 percent and 72.4 percent, respectively, are greater than the average for all departments (appendix tables B-11 and B-12).

Overall, more than half of the faculty without doctorates have tenure (54.4 percent), a fact suggesting that a majority of this group have been staff members for a number of years. Although nearly two-thirds of the faculty without doctorates are in departments in four fields—economics, electrical engineering, mathematics, and sociology—there are great differences between fields in the proportion of those with tenure. In electrical engineering and mathematics, 83.8 percent and 68.4 percent of the nondoctorate faculty, respectively, are tenured, compared to 35.7 percent in economics and 20.5 percent in sociology (appendix tables B-1 and B-8).

---

[5] Alan E. Bayer, "Teaching Faulty in Academe: 1972-73," *ACE Research Reports* 8, 2 (Washington, D.C.: American Council on Education), 1973.

[6] Roose and Andersen, *op. cit.*

Research Activity

The survey findings show a high level of research activity for full-time science and engineering faculty, as measured by the proportion of faculty spending 20 percent or more of their time in research.[7] Overall, 83.6 percent of the faculty are involved in research to at least that extent; for convenience, this group will be referred to as faculty "investigators." The degree of research activity is greatest for faculty in departments rated as "distinguished" or "strong" in the Roose-Andersen study, where 91.1 percent are found to be investigators. Departments in private institutions have a considerably higher proportion of faculty investigators than do those in public institutions, 88.0 percent compared to 81.9 percent. For the 20 largest departments in each field in terms of fall 1973 full-time graduate enrollment—the majority of which are in public institutions—84.9 percent of the faculty are in the investigator group (appendix tables B-19—B-23 and B-25—B-29).

Typically, a higher proportion of young doctorates than of senior doctorates or nondoctorates are spending 20 percent or more of their time in research. For 1974 the overall proportions of faculty investigators are 89.1 percent of young doctorates, 84.2 percent of senior doctorates, and 34.8 percent of those without doctorates (appendix table B-19).

In 1974 there is considerable variation in the proportion of faculty investigators by field. More than 9 out of 10 faculty in departments of

---

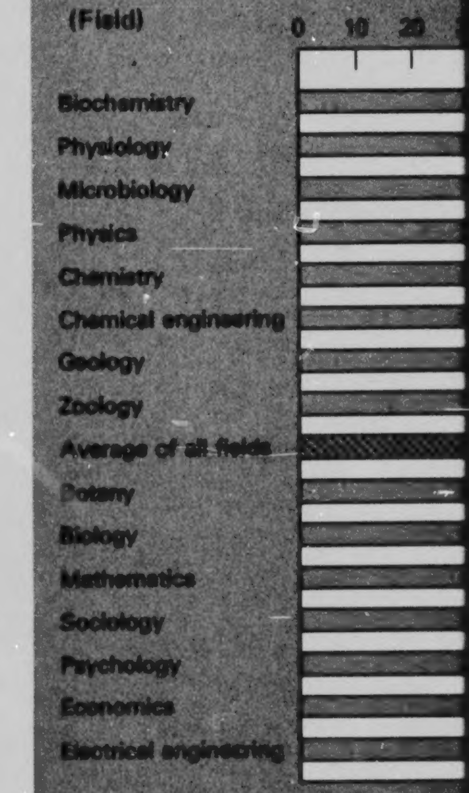
[7] The definition for research activity, admittedly somewhat arbitrary, serves to establish as a minimum standard a substantial degree of ongoing faculty research involvement. The definition does not provide a basis to delineate those who spend, for example, 50 percent or more of their time in research.

Table 2. Percent of faculty spending 20 percent or more of their time in research for matched doctorate-level science and engineering departments: 1968 and 1974

Year	All faculty	Young doctorate faculty	Senior doctorate faculty	Faculty without doctorates
1968	83.3	90.9	84.0	34.7
1974	84.9	90.8	85.0	35.3
Change, 1968-74	+ 1.6	-.1	+1.0	+ .6

Source: National Science Foundation.

Proportion of full-time facult and engineering departments of their time in research, by fi



SOURCE: National Science Foundation

gh level of research activity for full-time
measured by the proportion of faculty
time in research.[7] Overall, 83.6 percent of
at least that extent; for convenience, this
nvestigators." The degree of research ac-
nents rated as "distinguished" or "strong"
ere 91.1 percent are found to be in-
institutions have a considerably higher
than do those in public institutions, 88.0
or the 20 largest departments in each field
enrollment—the majority of which are in
the faculty are in the investigator group
25—B-29).

of young doctorates than of senior doc-
ding 20 percent or more of their time in
rtions of faculty investigators are 89.1 per-
nt of senior doctorates, and 34.8 percent
dix table B-19).

variation in the proportion of faculty in-
out of 10 faculty in departments of

---

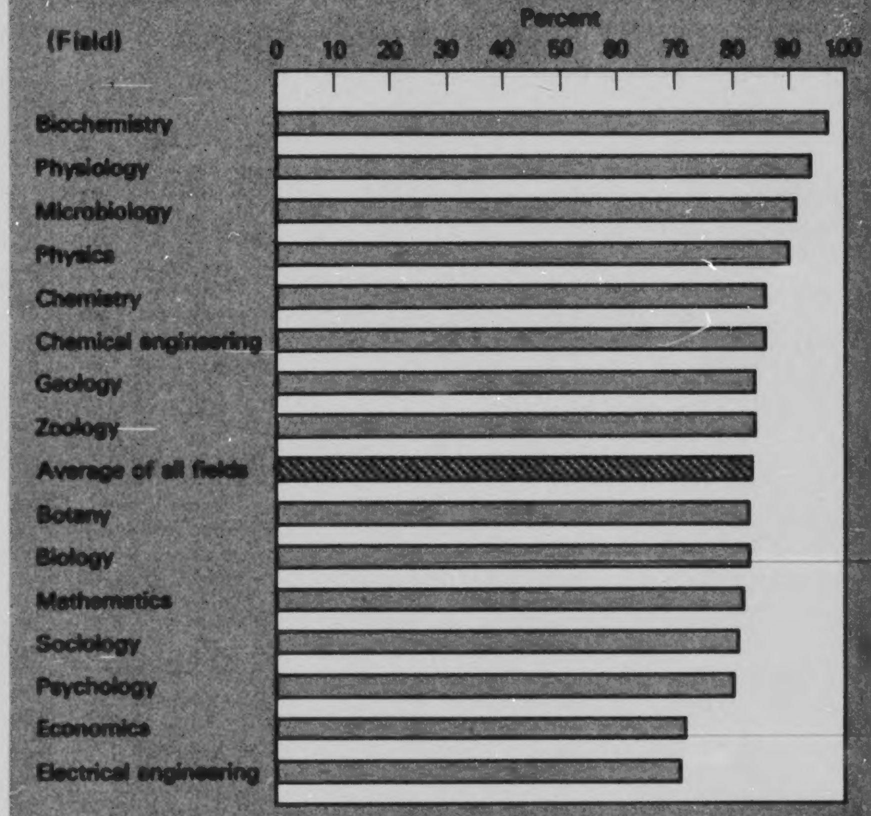
dly somewhat arbitrary, serves to establish as a minimum
esearch involvement. The definition does not provide a
, 50 percent or more of their time in research.

**of faculty spending
nt or more of
in research for
te-level science and
tments: 1968 and 1974**

	Young doctorate faculty	Senior doctorate faculty	Faculty without doctorates
	90.9	84.0	34.7
	90.8	85.0	35.3
	-.1	+1.0	+.6

oundation.

Proportion of full-time faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research, by field, 1974



SOURCE: National Science Foundation

Research Connected With Federally Supported Projects

For all 15 fields combined in 1974, more than one-half of the faculty investigators (55.9 percent) are doing research directly connected with project grants and contracts awarded by Federal agencies. There are great differences among the several fields, however, with more than three-fourths of the faculty investigators in biochemistry, but only about one-fourth of those in sociology, doing research connected with federally supported projects (table 3 and appendix table B-31).

The proportion of senior doctorate faculty investigators, 60.8 percent, doing research connected with federally supported projects is substantially greater than that for young doctorate faculty investigators, 46.3 percent. Senior/young ratios facilitate comparisons of these proportions for the various fields and departmental groupings. A senior/young ratio of 1.00 would signify that equal proportions of senior and young faculty investigators are doing research directly connected with federally supported projects. Based on data from all responding departments, the ratios for all fields are greater than 1.00. The fields with the greatest disparity are botany and psychology, with ratios of 1.66 and 1.69, respectively, indicating that much greater proportions of senior than of young faculty investigators are doing research connected with federally supported projects (table 3 and appendix table B-31).

There are also substantial differences among the various groups of departments with respect to the proportion of faculty investigators who are doing research directly connected with Federal project grants and contracts. Only slightly more than one-half (51.3 percent) of the faculty investigators in public institutions are doing research connected with federally supported projects compared to nearly two-thirds (65.1 percent) of those in the 20 largest departments in graduate enrollment, more than two-thirds (67.1 percent) of those in private institutions, and almost three-fourths (72.4 percent) of those in departments rated as "distinguished" or "strong" in the Roose-Andersen study. In addition, the ratio of senior to young doctorate investigators doing research connected with federally supported projects is higher for public institutions than for other groups of departments, 1.36 compared to an average of 1.23 (appendix tables B-31—B-35).

Table 3. Proportion of
doing research connect
grants and contracts
to young doctorat
doctorate-level scien
departments,

Field (Ranked)	A in
Biochemistry	
Physiology	
Microbiology	
Physics	
Electrical engineering	
Chemical engineering	
Biology	
Geology	
Chemistry	
All Fields	
Zoology	
Psychology	
Mathematics	
Botany	
Economics	
Sociology	

[1]Those spending 20 perc
research.

Source: National Science Foun

Federally

74, more than one-half of the faculty in-
esearch directly connected with project
Federal agencies. There are great
owever, with more than three-fourths of
try, but only about one-fourth of those in
with federally supported projects (table 3

rate faculty investigators, 60.8 percent,
rally supported projects is substantially
ate faculty investigators, 46.3 percent.
parisons of these proportions for the
pings. A senior/young ratio of 1.00 would
r and young faculty investigators are do-
federally supported projects. Based on
nts, the ratios for all fields are greater
st disparity are botany and psychology,
ely, indicating that much greater propor-
investigators are doing research con-
jects (table 3 and appendix table B-31).

erences among the various groups of
portion of faculty investigators who are
ith Federal project grants and contracts.
3 percent) of the faculty investigators in
connected with federally supported pro-
(65.1 percent) of those in the 20 largest
, more than two-thirds (67.1 percent) of
st three-fourths (72.4 percent) of those in
d" or "strong" in the Roose-Andersen
to young doctorate investigators doing
upported projects is higher for public in-
partments, 1.36 compared to an average
).

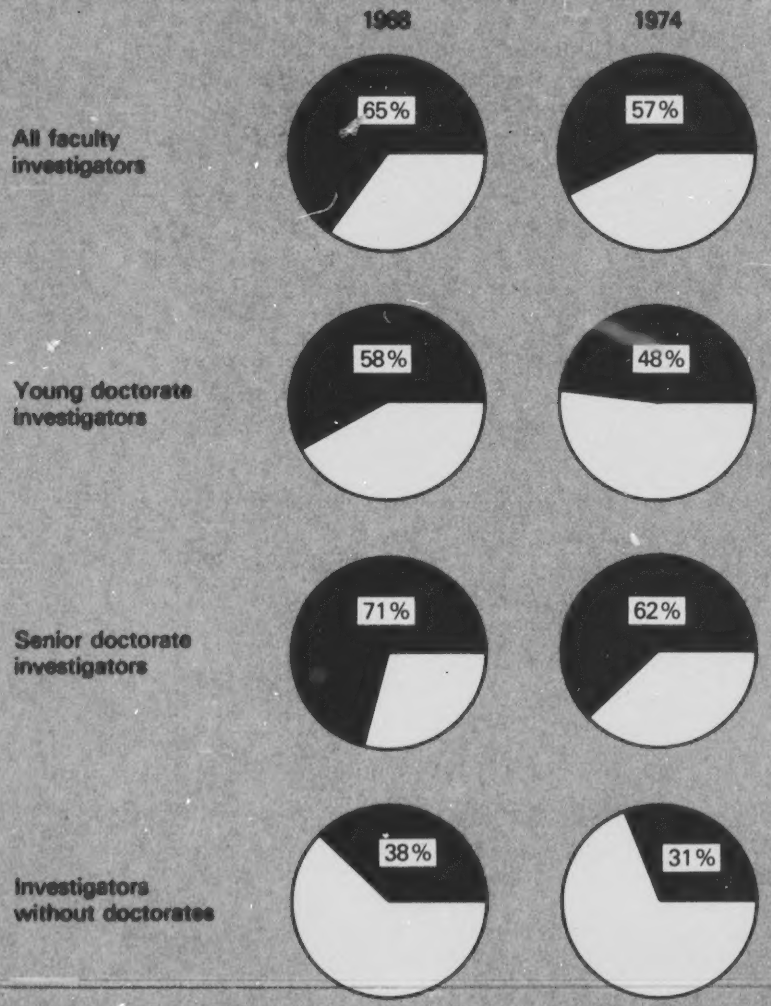
Table 3. Proportion of faculty investigators[1] doing research connected with Federal project grants and contracts and ratio of senior to young doctorate investigators in doctorate-level science and engineering departments, by field: 1974

Field (Ranked)	As percent of all faculty investigators	Ratio of senior to young doctorate investigators for federally supported projects
Biochemistry	77.6	1.11
Physiology	75.0	1.06
Microbiology	74.0	1.09
Physics	72.1	1.14
Electrical engineering	71.2	1.06
Chemical engineering	65.4	1.03
Biology	61.7	1.25
Geology	58.6	1.23
Chemistry	57.5	1.26
All Fields	55.9	1.31
Zoology	51.8	1.05
Psychology	43.2	1.69
Mathematics	42.4	1.25
Botany	42.3	1.66
Economics	30.0	1.18
Sociology	26.4	1.24

[1] Those spending 20 percent or more of their time in research.

Source: National Science Foundation.

Proportion of faculty investigators[a] in matched doctorate-level science and engineering departments doing research directly connected with Federal project grants and contracts, 1968-74

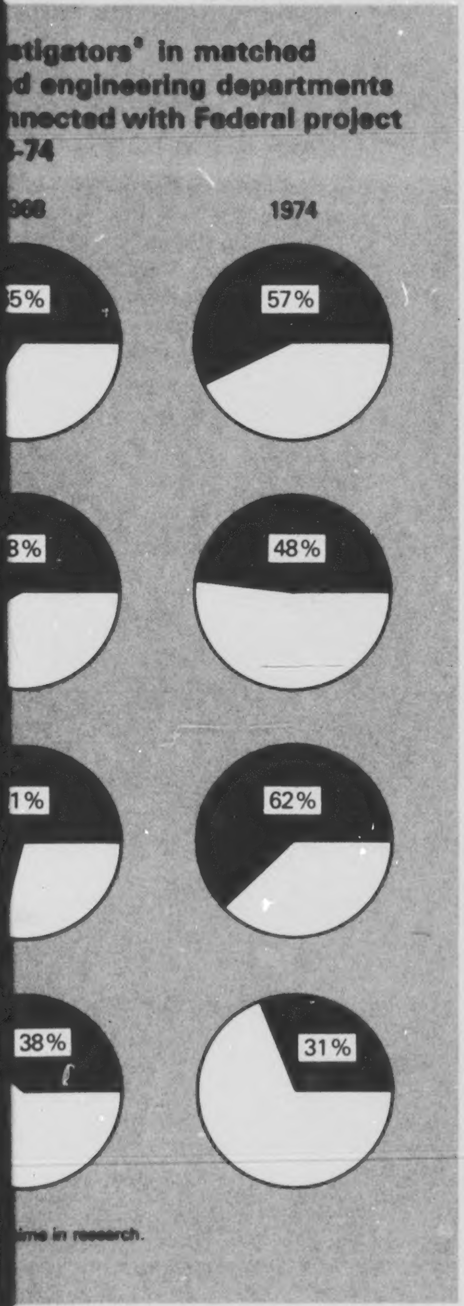


[a] Those spending 20 percent or more of their time in research.
SOURCE: National Science Foundation

Compared with 1968, the 602 depa a substantial decline for 1974 in the pr research directly connected with proj Federal agencies (appendix table B-36 from other NSF surveys[8] which show support for research and development several years after 1968. However, dat stated above, that the overall prop research on projects supported by Federal—increased slightly between 1 veyed in both years.

---

[8] See National Science Foundation, *Federal Fu* *Activities*, annual series, and *Resources for Scientific* (Washington, D.C. 20402: Supt. of Documents, U.S



Compared with 1968, the 602 departments included in both surveys show a substantial decline for 1974 in the proportion of faculty investigators doing research directly connected with project grants and contracts awarded by Federal agencies (appendix table B-36). This finding is consistent with data from other NSF surveys[8] which show that, in constant dollar terms, Federal support for research and development in colleges and universities declined for several years after 1968. However, data from the present survey indicate, as stated above, that the overall proportion of faculty investigators doing research on projects supported by all sources—both Federal and non-Federal—increased slightly between 1968 and 1974 in the departments surveyed in both years.

---

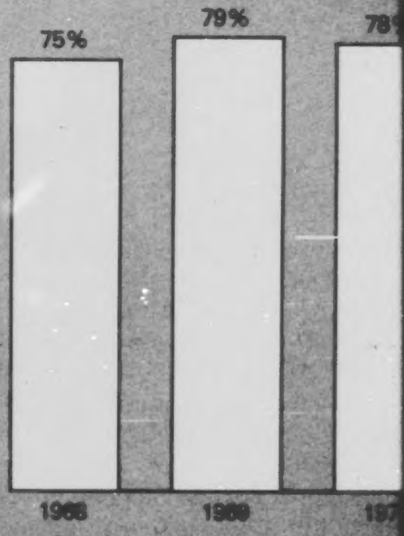
[8] See National Science Foundation, *Federal Funds for Research, Development, and Other Scientific Activities*, annual series, and *Resources for Scientific Activities at Universities and Colleges*, annual series (Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office.)

Source of Research Funds

For approximately 83 percent of the departments, more than one-half of all research funds available to faculty come from Federal research project funds. As with other items, there are differences among fields. The greatest proportion of departments reporting that one-half or more of their research funds come from sources *other* than Federal project funds are in the fields of botany, economics, and sociology (appendix table B-37).

Appropriateness of Split of Research Funding

In view of the importance of support of new researchers, the Foundation has periodically surveyed this situation in selected doctorate-level science and engineering departments. More than three-fourths (78 percent) of the responding department chairmen feel that in 1974 there is an appropriate split of available research funds—both Federal and non-Federal—for young doctorate faculty. Similar responses to the question of an appropriate split of research funds for young doctorate faculty were reported by NSF surveys made in 1968, 1969, and 1970—75 percent, 79 percent, and 78 percent, respectively. A 1971 Higher Education Panel sample survey[9] produced a very similar weighted estimate, 75 percent. Between one-fifth and one-fourth of the department heads have stated each time that the split of research funds for young doctorate faculty is not appropriate. Although the overall situation seems to change little, there is considerable variation over time by field, as shown in table 4. (Also see appendix tables B-38—B-44.)



Proportion of department c
opinion that there is an app
young faculty in doctorate-
1968-74

(Selected science an

SOURCE: National Science Foundation

---

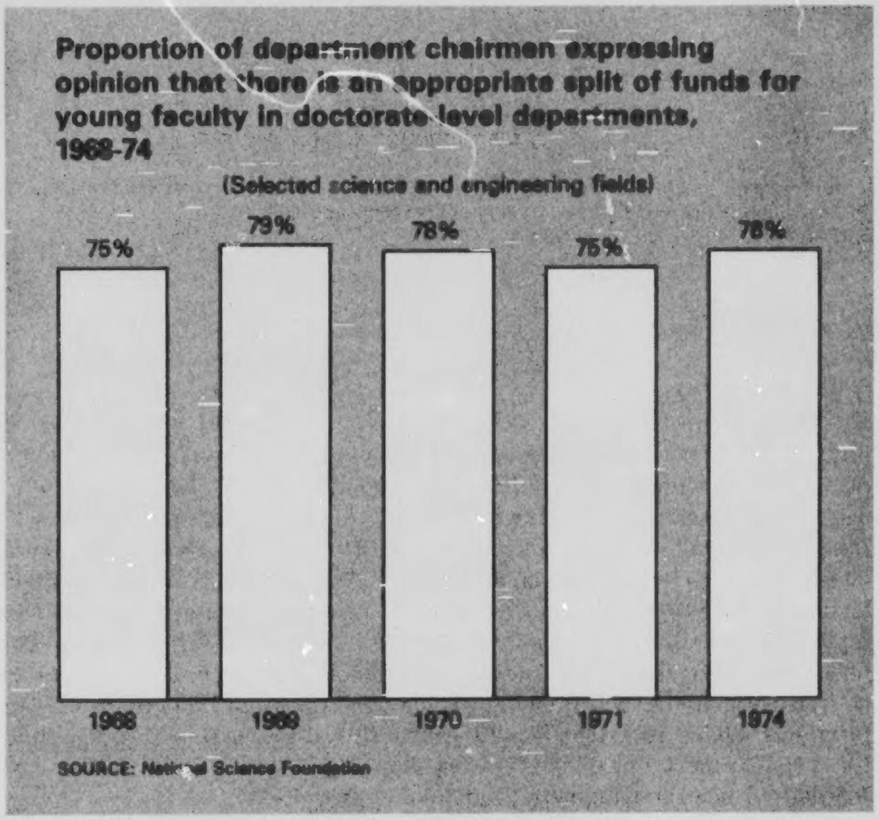
[9] "Research Support for Science Faculty," *Higher Education Panel Report Number 2* (Washington, D.C.: American Council on Education), 1971. The Higher Education Panel is supported jointly by the National Science Foundation, the National Institutes of Health, and the U.S. Office of Education.

the departments, more than one-half of
y come from Federal research project
differences among fields. The greatest
that one-half or more of their research
Federal project funds are in the fields of
ppendix table B-37).

f Research Funding

ort of new researchers, the Foundation
n in selected doctorate-level science and
an three-fourths (78 percent) of the
that in 1974 there is an appropriate split
deral and non-Federal—for young doc-
he question of an appropriate split of
faculty were reported by NSF surveys
ent, 79 percent, and 78 percent, respec-
sample survey[9] produced a very similar
n one-fifth and one-fourth of the depart-
at the split of research funds for young
Although the overall situation seems to
riation over time by field, as shown in
38– B-44.)

her Education Panel Report Number 2 (Washington,
Higher Education Panel is supported jointly by the
s of Health, and the U.S. Office of Education.



Proportion of department chairmen expressing opinion that there is an appropriate split of funds for young faculty in doctorate-level departments, 1968-74

(Selected science and engineering fields)

SOURCE: National Science Foundation

Table 4. Proportion of doctorate-level science and engineering departments reporting that split of research funds for young doctorate faculty is not appropriate, by field: 1968-74

Selected departments, by field	Percent of departments			
	1968	1969	1970	1974
All selected science departments	24.9	20.4	21.7	21.5
Biochemistry	30.8	N.A.	38.1	15.2
Biology	14.9	28.8	23.1	28.0
Botany	N.A.	N.A.	N.A.	28.9
Chemical engineering	18.6	21.2	18.5	15.9
Chemistry	34.4	27.1	26.9	21.7
Economics	21.8	16.3	9.3	18.4
Electrical engineering	25.7	15.1	8.9	25.3
Geology	N.A.	N.A.	N.A.	22.0
Mathematics	24.7	23.3	27.4	24.5
Microbiology	16.7	19.5	26.7	19.6
Physics	28.9	23.4	24.3	16.7
Physiology	16.7	22.2	23.1	22.6
Psychology	16.2	12.1	14.8	27.9
Sociology	31.6	14.9	18.4	24.2
Zoology	N.A.	N.A.	N.A.	14.6

N.A. = Not available

Note: Data for 1969 and 1970 may not be strictly comparable to those for 1968 and 1974 because of differences in the format of the wording of the survey question.

Source: National Science Foundation.

Department heads who state that the current (1974) split of research funds is not appropriate were asked to indicate what they would consider to be an appropriate proportion of funds for young faculty in their department. These recommended proportions of research funds have been compared with the proportion of young faculty in these departments. In general, department heads appear to believe that an appropriate split of research funds for young faculty would be one reflecting the proportion of young faculty to total faculty (appendix table B-45). A slight majority, 52.2 percent, of these department heads also favor the creation of special Federal research support programs specifically limited to young faculty. There is only scattered support for similar programs limited to senior faculty. Seven out of ten who favor creation of these special programs think that some of the support provided should be earmarked for special equipment (appendix table B-46).

Support in Chosen Resear

Information on the degree to w
secure support in research areas of th
sight to understanding the curren
Somewhat more than one-half of the
vestigators in their departments are
research areas of their own choosing
rated as "distinguished" or "strong" in
the 20 largest departments in fall 1973
be somewhat more successful than th
securing support in research areas of th
almost one-third of the department he
Except for departments in private in
have been slightly more able to secure
choosing than their senior colleagues
differences among the various groups
B-51).

Table 5. Proportio
science and engin
indicating that fa
generally are
support in res
their own ch

Department by type
All departments
Departments in private institutions
Departments in public institutions
"Distinguished" or "strong" departments (Roose-Andersen)
20 largest departments in fall 1973 full-time graduate enrollment

Source: National Science Fou

rate-level science and engineering
hat split of research funds for
y is not appropriate, by field:
968-74

	Percent of departments		
	1969	1970	1974
	20.4	21.7	21.5
	N.A.	38.1	15.2
	28.8	23.1	28.0
	N.A.	N.A.	28.9
	21.2	18.5	15.9
	27.1	26.9	21.7
	16.3	9.3	18.4
	15.1	8.9	25.3
	N.A.	N.A.	22.0
	23.3	27.4	24.5
	19.5	26.7	19.6
	23.4	24.3	16.7
	22.2	23.1	22.6
	12.1	14.8	27.9
	14.9	18.4	24.2
	N.A.	N.A.	14.6

ictly comparable to those for 1968 and 1974 because
f the survey question.

hat the current (1974) split of research
c indicate what they would consider to be
s for young faculty in their department.
research funds have been compared with
ese departments. In general. department
ropriate split of research funds for young
roportion of young faculty to total faculty
ority, 52.2 percent, of these department
ecial Federal research support programs
There is only scattered support for similar
Seven out of ten who favor creation of
me of the support provided should be ear-
endix table B-46).

Support in Chosen Research Area

Information on the degree to which faculty investigators are able to secure support in research areas of their own choosing provides valuable insight to understanding the current state of faculty research activity. Somewhat more than one-half of the department heads feel that faculty investigators in their departments are generally able to secure support in research areas of their own choosing. Faculty investigators in departments rated as "distinguished" or "strong" in the Roose-Andersen study and those in the 20 largest departments in fall 1973 full-time graduate enrollment appear to be somewhat more successful than their colleagues in other departments in securing support in research areas of their own choosing. Even here, however, almost one-third of the department heads, report there are major problems. Except for departments in private institutions, young faculty investigators have been slightly more able to secure support in research areas of their own choosing than their senior colleagues. Table 5 presents a summary of the differences among the various groups of departments (appendix tables B-47—B-51).

Table 5. Proportion of doctorate-level science and engineering departments indicating that faculty investigators generally are able to secure support in research areas of their own choosing: 1974

Department by type	Percent of departments	
	Young investigators	Senior investigators
All departments	55.5	54.8
Departments in private institutions	55.6	57.4
Departments in public institutions	55.4	53.5
"Distinguished" or "strong" departments (Roose-Andersen)	64.6	63.6
20 largest departments in fall 1973 full-time graduate enrollment	64.5	62.0

Source: National Science Foundation.

Mathematics faculty in public institutions appear to be having great difficulty in securing support in research areas of their own choosing. This situation prevails in almost three-fourths of the departments (for young investigators—72.5 percent of departments; for senior investigators—74.3 percent of departments). Other fields in which substantial difficulties have been noted are as follows:

(1) Departments in private institutions—young investigators in chemical engineering and economics; senior investigators in chemistry;

(2) Departments in public universities (in addition to mathematics already noted above)—senior investigators in physics;

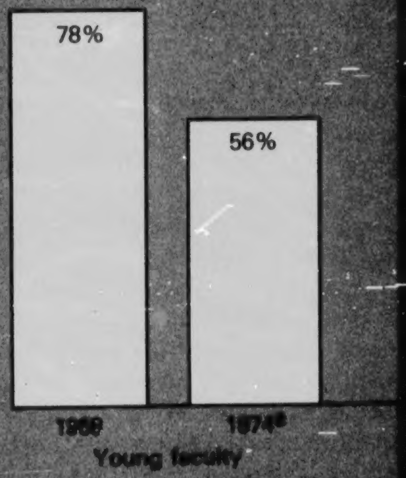
(3) Departments rated as "distinguished" or "strong" in the Roose-Andersen study—young investigators in botany; senior investigators in chemical engineering;

(4) 20 largest departments in fall 1973 full-time graduate enrollment—young investigators in botany; senior investigators in chemical engineering and mathematics.

For the departments reporting that faculty investigators generally have not been able to secure support in research areas of their own choosing, an analysis of faculty data reveals the following: More than one-half (51.3 percent) of the young investigators and more than one-third (37.8 percent) of the senior investigators in these departments were unable to secure support in research areas of their own choosing during the preceding 12-month period. Approximately nine-tenths of these department heads said that they consider this situation to be a major problem (appendix tables B-52 and B-53).

In 1968, the situation was very different. That year more than three-fourths of the departments (compared to about one-half in 1974) reported that faculty were able to select research areas of their own choosing. Furthermore, the department heads citing the problem of choice of research area generally classified it as a minor problem in 1968. Although the comparison between 1968 and 1974 responses on this item may have to be tempered somewhat by the fact that data for only 10 fields are included, the direction of the change is clear and its magnitude is corroborated by the fact that most department heads now consider this problem to be major rather than minor.

Percent of doctorate-level
departments in which facul
receive support in areas of



aData represent 10 fields included in the 19
chemical engineering, chemistry, electrical eng
physiology, and sociology. Therefore, figures for
which are based on data for 16 fields. Because of
question on the two surveys, the data for the

SOURCE: National Science Foundation

stitutions appear to be having great dif- areas of their own choosing. This situa- ths of the departments (for young tments; for senior investigators—74.3 s in which substantial difficulties have

institutions—young investigators in economics; senior investigators in

versities (in addition to mathematics or investigators in physics;

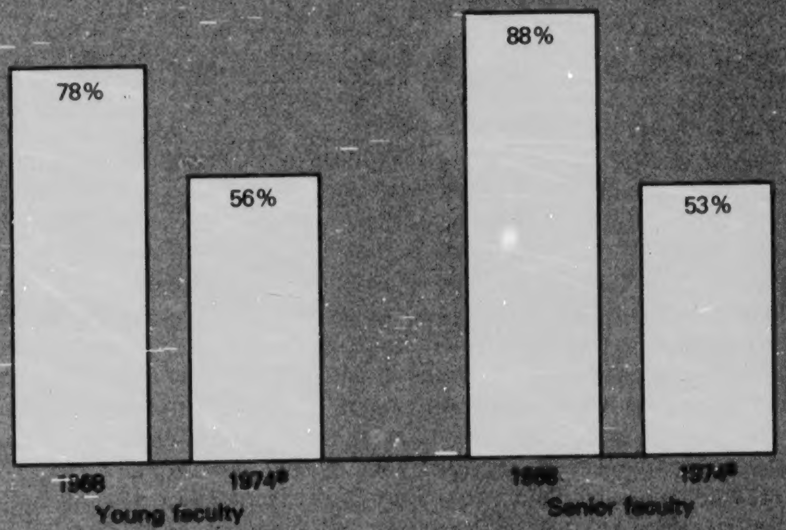
tinguished" or "strong" in the Roose- estigators in botany; senior investigators

ll 1973 full-time graduate enrollment— any; senior investigators in chemical s.

hat faculty investigators generally have search areas of their own choosing, an owing: More than one-half (51.3 percent) an one-third (37.8 percent) of the senior re unable to secure support in research the preceding 12-month period. Ap- artment heads said that they consider (appendix tables B-52 and B-53).

different. That year more than three- to about one-half in 1974) reported that eas of their own choosing. Furthermore, em of choice of research area generally 68. Although the comparison between may have to be tempered somewhat by included, the direction of the change is ted by the fact that most department be major rather than minor.

Percent of doctorate-level science and engineering departments in which faculty generally are able to receive support in areas of own choosing, 1968-74



[a]Data represent 10 fields included in the 1968 survey for this item: biochemistry, biology, chemical engineering, chemistry, electrical engineering, mathematics, microbiology, physics, physiology, and sociology. Therefore, figures for 1974 differ slightly from those given in table [illegible], which are based on data for 15 fields. Because of differences in the format of the wording of the question on the two surveys, the data for the two years may not be strictly comparable.

SOURCE: National Science Foundation

Participation in Research Projects At Industrial and Government Laboratories

To gain a broad perspective of the research activity of science and engineering faculty investigators, information was collected on the number who participated in research projects in government or industrial laboratories during the 12 months ending in May 1974. Faculty participation rates are low for both activities—2.9 percent for projects in industrial laboratories and 5.0 percent for projects in government laboratories. In general, the participation of senior investigators is somewhat greater than that of young investigators. Faculty investigators in chemistry, chemical engineering, and electrical engineering departments account for over one-half (57.5 percent) of those participating in research projects in industrial laboratories while those in physics departments alone account for nearly one-half (47.8 percent) of the participants in research projects in government laboratories (appendix tables B-54 and B-55).

Change in Time Spent in Classroom Teaching

For about two-thirds of the departments, regular full-time faculty are spending about the same proportion of time engaged in classroom teaching in 1974 as they did in 1970. For the departments reporting changes of 10 percent or more in classroom teaching time, those with increases outnumber those with decreases by nearly six to one in the case of senior faculty and by more than four to one for young faculty. Fields with proportionately the greatest number of departments reporting increases in teaching time are biochemistry, biology, microbiology, physiology, and physics. Correspondingly, the fields with the greatest decreases in teaching time are chemical engineering, electrical engineering, and zoology. In general, changes in Federal funding are seen as being the primary cause of changes in classroom teaching time by only about one-fourth of the affected departments (appendix table B-56). The reason for the changes cited most frequently by the remaining departments is administrative or legislative decision requiring standard teaching load.

The changes in classroom teaching time reported for the 1970-74 period, when compared with similar data for 1968-70, strongly suggest a trend towards increases in faculty time spent in teaching (table 6). How much the level of faculty research activity has been affected by this development cannot be determined from the survey data.

**Table 6. Change in
time of full-t
doctorate-level scie
departmen**

Teaching time
Greater
Lesser
About the same

[1] *Impact of Changes in Fe on Academic Institutions,* National Science Foundation

[2] For this item, the 1970 tion separately for young and possible the comparison with been developed in the 1970 fo data differ slightly from those 56 because nonrespondents tionately across the three cla

Source: National Science Fou

Projects
ment

of the research activity of science and formation was collected on the number in government or industrial laboratories 1974. Faculty participation rates are low rojects in industrial laboratories and 5.0 aboratories. In general, the participation greater than that of young investigators. chemical engineering, and electrical over one-half (57.5 percent) of those par- strial laboratories while those in physics rly one-half (47.8 percent) of the par- rnment laboratories (appendix tables B-

Classroom Teaching

partments, regular full-time faculty are of time engaged in classroom teaching in rtments reporting changes of 10 percent those with increases outnumber those n the case of senior faculty and by more Fields with proportionately the greatest reases in teaching time are biochemistry, nd physics. Correspondingly, the fields ing time are chemical engineering, elec- eneral, changes in Federal funding are nges in classroom teaching time by only partments (appendix table B-56). The quently by the remaining departments is requiring standard teaching load.

ng time reported for the 1970-74 period, 968-70, strongly suggest a trend towards ching (table 6). How much the level of ffected by this development cannot be

Table 6. Change in classroom teaching time of full-time faculty in doctorate-level science and engineering departments: 1968-74

Teaching time	Percent of departments	
	1968-70[1]	1970-74[2]
Greater	12.3	28.0
Lesser	4.1	5.5
About the same	83.5	66.5

[1] *Impact of Changes in Federal Science Funding Patterns on Academic Institutions, 1968-70* (Washington, D.C.: National Science Foundation), p. 35.

[2] For this item, the 1970 survey did not request information separately for young and senior faculty. In order to make possible the comparison with the earlier data, estimates have been developed in the 1970 format from the 1974 data. These data differ slightly from those presented in appendix table B-56 because nonrespondents have been distributed proportionately across the three classes.

Source: National Science Foundation.

SELECTED CHARACTERISTICS OF SCIENCE AND ENGINEERING DEPARTMENTS, 1973-74

By using data from two NSF surveys, the responding departments may be compared further. The present survey provides information on faculty for the spring of 1974. The Foundation's Graduate Science Student Support Survey provides information on full-time graduate enrollment in these departments for the fall of 1973. Table 7 presents for various groups of departments the average number of full-time faculty per department, the average full-time graduate enrollment per department, and the unadjusted ratio of full-time graduate students to full-time faculty. For each grouping, information is presented for all respondents that may properly be included. For example, in the case of departments included in both the 1968 and 1974 surveys, only data for the 12 fields common to both surveys are used. (Also see appendix tables B-57—B-68).

In the interpretation of these data, however, it is important to note that the unadjusted ratio of full-time graduate students to full-time faculty is likely to understate the case for two reasons: (1) not all full-time faculty are active in graduate education,[10] and (2) part-time graduate students are not taken into consideration. Adjustments for these two factors would both work to produce a larger number of graduate students per faculty member. Furthermore, the proportion of part-time graduate enrollment varies considerably by field. On the other hand, if part-time faculty had been included, this factor would have reduced the ratios somewhat. Although there are limitations inherent in the unadjusted ratio of full-time graduate enrollment to full-time faculty, still the ratio provides useful information on full-time graduate education, which is the larger component of the activity.

Private institutions, which make up slightly more than one-third of the survey population (35.6 percent), account for 32.5 percent of the responding departments but only 28.0 percent of the full-time faculty and 28.6 percent of the full-time graduate enrollment. While responding departments in private institutions, on the average, have fewer faculty and graduate students than those in public institutions, they have a slightly greater unadjusted ratio of graduate students to faculty, 2.40:1 compared to 2.32:1 (appendix tables B-57, B-58, B-64, and B-65).

When the 20 largest responding d
graduate enrollment for each field, 300
remaining departments, striking
departments, more than three-fourth
count for 32.8 percent of the full-time

Table 7. Selecte
of doctorate-le
engineering
197

Respondent group	A nu fu f
All departments	
Departments in private institutions	
Departments in public institutions	
20 largest departments in graduate enrollment ...	
All other departments ...	
Departments rated "distinguished" or "strong" (Roose-Andersen)[2]	
All other departments[2] ..	
Departments included in both 1968 and 1974 surveys[3]	
All other departments[3] ..	

[1] Unadjusted.
[2] Biology departments are
[3] Botany, geology, and zo
cluded.
Source: National Science Fou

---

[10] A 1973 ACE study found that 34 percent of the faculty in all fields combined at universities were teaching courses in which no graduate students were enrolled. Bayer, "Teaching Faculty in Academe: 1972-73," *op. cit.*

CTERISTICS OF SCIENCE AND ENGINEERING

73-74

ırveys, the responding departments may
urvey provides information on faculty for
Graduate Science Student Support Sur-
ll-time graduate enrollment in these
Table 7 presents for various groups of
of full-time faculty per department, the
nt per department, and the unadjusted
o full-time faculty. For each grouping, in-
dents that may properly be included. For
included in both the 1968 and 1974 sur-
mon to both surveys are used. (Also see

ta, however, it is important to note that
ate students to full-time faculty is likely to
: (1) not all full-time faculty are active in
me graduate students are not taken into
two factors would both work to produce
s per faculty member. Furthermore, the
ollment varies considerably by field. On
ad been included, this factor would have
ugh there are limitations inherent in the
e enrollment to full-time faculty, still the
ull-time graduate education, which is the

e up slightly more than one-third of the
count for 32.5 percent of the responding
of the full-time faculty and 28.6 percent of
hile responding departments in private in-
wer faculty and graduate students than
ve a slightly greater unadjusted ratio of
ompared to 2.32:1 (appendix tables B-57,

When the 20 largest responding departments in terms of fall 1973 full-time graduate enrollment for each field, 300 departments in all, are compared to the remaining departments, striking differences are noted. These 300 departments, more than three-fourths of which are in public institutions, account for 32.8 percent of the full-time faculty and 46.9 percent of the full-time

Table 7. Selected characteristics of doctorate-level science and engineering departments: 1973-74

Respondent group	Average number of full-time faculty	Average full-time graduate enrollment	Graduate student: faculty ratio[1]
All departments	21	49	2.34:1
Departments in private institutions	18	43	2.40:1
Departments in public institutions	22	52	2.32:1
20 largest departments in graduate enrollment ...	31	105	3.36:1
All other departments ...	18	33	1.85:1
Departments rated "distinguished" or "strong" (Roose-Andersen)[2]	28	86	3.11:1
All other departments[2] ..	20	37	1.80:1
Departments included in both 1968 and 1974 surveys[3]	25	64	2.53:1
All other departments[3] ..	18	36	2.01:1

[1] Unadjusted.

[2] Biology departments are not included.

[3] Botany, geology, and zoology departments are not included.

Source: National Science Foundation.

---

of the faculty in all fields combined at universities were
re enrolled. Bayer, "Teaching Faculty in Academe: 1972-

graduate students. The unadjusted ratio of graduate students to faculty for these 300 departments, 3.36:1, is much greater than that for the other 1,066 departments, 1.85:1 (appendix tables B-61 and B-67). Whether or not these 1,066 departments have the capacity to provide education for additional graduate students was not ascertained in the survey.

The 313 responding departments rated as “distinguished” or “strong” by the Roose-Andersen study[11] consist of 47.3 percent from private institutions and 52.7 percent from public institutions. Furthermore, there is substantial overlap with the 20 largest departments in terms of fall 1973 full-time graduate enrollment, with 170 departments across all covered fields being in both groups. The Roose-Andersen rated departments have substantially larger numbers of faculty and graduate students, on the average, than other departments in the 14 fields covered. The unadjusted ratio of full-time graduate students to full-time faculty in the Roose-Andersen-rated departments is also much greater than that for the other departments, 3.11:1 compared to 1.80:1 (appendix tables B-59 and B-66).

The information in table 7 shows that the 602 departments included in both the 1968 and 1974 surveys are somewhat larger in terms of numbers of faculty and graduate enrollment than the other departments in the 12 fields covered. Many of the departments which responded to the 1974 survey probably did not have offerings at the doctorate level in 1968.

When these data are considered by field, substantial differences are also evident. In terms of all respondents, for example, mathematics departments have by far the largest average number of full-time faculty, 37, and chemical engineering departments have the fewest faculty, averaging 11. Psychology departments have the largest average full-time graduate enrollment, 80, and physiology departments have the fewest, 17. Departments in these two fields also have, respectively, the greatest and smallest unadjusted ratios of graduate students to faculty, 3.01:1 and 1.28:1 (appendix table B-63).

---

[11] Roose and Andersen, *op. cit.* The Roose-Andersen study rates 377 departments as being “distinguished” or “strong” in terms of quality of graduate faculty for the 160 survey institutions. Biology departments as designated in the present study are not rated by Roose-Andersen; therefore, the analysis is limited to 14 of the 15 fields. The 313 respondents represent 83.0 percent of the 377 departments. Because of the trend of mergers of separate botany and zoology departments into biology departments, the response rate may be understated. In 20 cases in which the Roose-Andersen study indicates a botany or zoology department, the response to the present study is from a biology department (appendix tables B-59 and B-60).

The chart presents comparisons
rated “distinguished” or “strong” in th
respondents in each of 14 selected scie
the Roose-Andersen-rated departmen
faculty, more full-time graduate stude
graduate students to faculty.

The 313 Roose-Andersen-rated de
cent of the respondents for the 14 fie
faculty and 42.6 percent of the full-tim
both Roose-Andersen-rated and all oth
have the largest average number of f
service function of mathematics dep
graduate levels. The field having the sm
the same for both groups of departm
order of the other fields is fairly simila

In terms of full-time graduate e
departments with an average of 86 stu
other departments in the respective fi
graduate students. There is, however,
for the two groups of departments in
enrollment. Electrical engineering has
graduate students for the Roose-And
department, but psychology has the la
the other departments, 69 students p

The unadjusted ratios of full-time
show for all fields except psycholog
Roose-Andersen-rated departments. T
dergraduate level, may account for mu
for Roose-Andersen-rated mathema
number of full-time faculty; fifth for ave
thirteenth for the unadjusted ratio of
dramatic difference is seen in the case
of chemical engineering, which rank fou
time faculty, ninth in average full-time g
adjusted ratio of graduate students to

ratio of graduate students to faculty for
ich greater than that for the other 1,066
s B-61 and B-67). Whether or not these
ity to provide education for additional
ed in the survey.

s rated as "distinguished" or "strong" by
of 47.3 percent from private institutions
tions. Furthermore, there is substantial
nts in terms of fall 1973 full-time graduate
across all covered fields being in both
departments have substantially larger
students, on the average, than other
red. The unadjusted ratio of full-time
aculty in the Roose-Andersen-rated
n that for the other departments, 3.11:1
B-59 and B-66).

s that the 602 departments included in
omewhat larger in terms of numbers of
the other departments in the 12 fields
which responded to the 1974 survey
e doctorate level in 1968.

by field, substantial differences are also
for example, mathematics departments
er of full-time faculty, 37, and chemical
west faculty, averaging 11. Psychology
e full-time graduate enrollment, 80, and
est, 17. Departments in these two fields
st and smallest unadjusted ratios of
and 1.28:1 (appendix table B-63).

e-Andersen study rates 377 departments as being
aduate faculty for the 160 survey institutions. Biology
not rated by Roose-Andersen; therefore, the analysis is
present 83.0 percent of the 377 departments. Because
zoology departments into biology departments, the
hich the Roose-Andersen study indicates a botany or
dy is from a biology department (appendix tables B-59

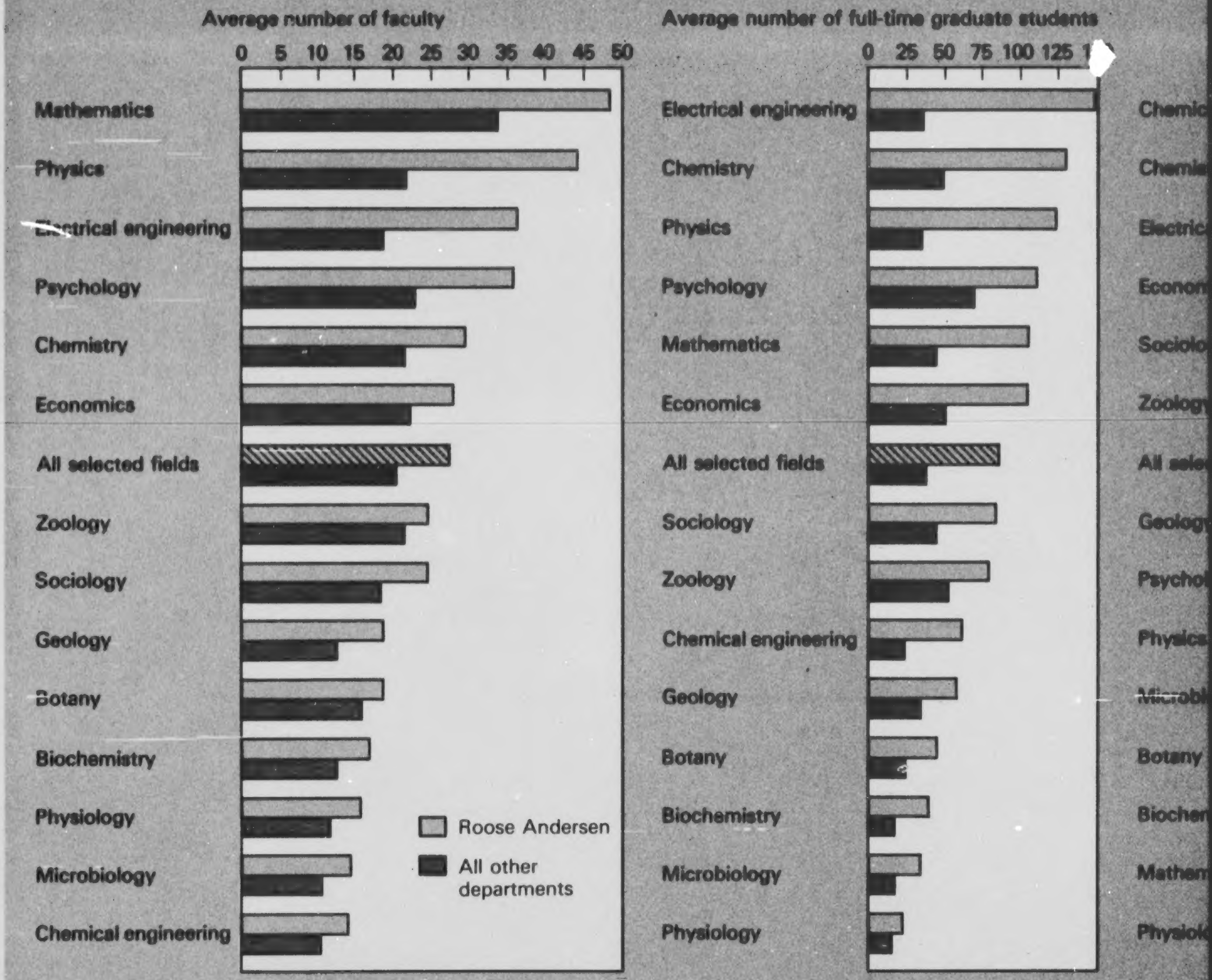
The chart presents comparisons between the responding departments rated "distinguished" or "strong" in the Roose-Andersen study and all other respondents in each of 14 selected science and engineering fields. For all fields the Roose-Andersen-rated departments have, on the average, more full-time faculty, more full-time graduate students, and greater unadjusted ratios of graduate students to faculty.

The 313 Roose-Andersen-rated departments, which account for 24.2 percent of the respondents for the 14 fields, have 32.3 percent of the full-time faculty and 42.6 percent of the full-time graduate students in these fields. For both Roose-Andersen-rated and all other departments, those in mathematics have the largest average number of full-time faculty, which may reflect the service function of mathematics departments at the undergraduate and graduate levels. The field having the smallest average number of faculty is also the same for both groups of departments, chemical engineering. The rank order of the other fields is fairly similar for the two groups of departments.

In terms of full-time graduate enrollment, the Roose-Andersen-rated departments with an average of 86 students, are substantially larger than the other departments in the respective fields, which have an average of only 37 graduate students. There is, however, considerable difference between fields for the two groups of departments in the rank order by average graduate enrollment. Electrical engineering has the largest average number of full-time graduate students for the Roose-Andersen departments, 149 students per department, but psychology has the largest average graduate enrollment for the other departments, 69 students per department.

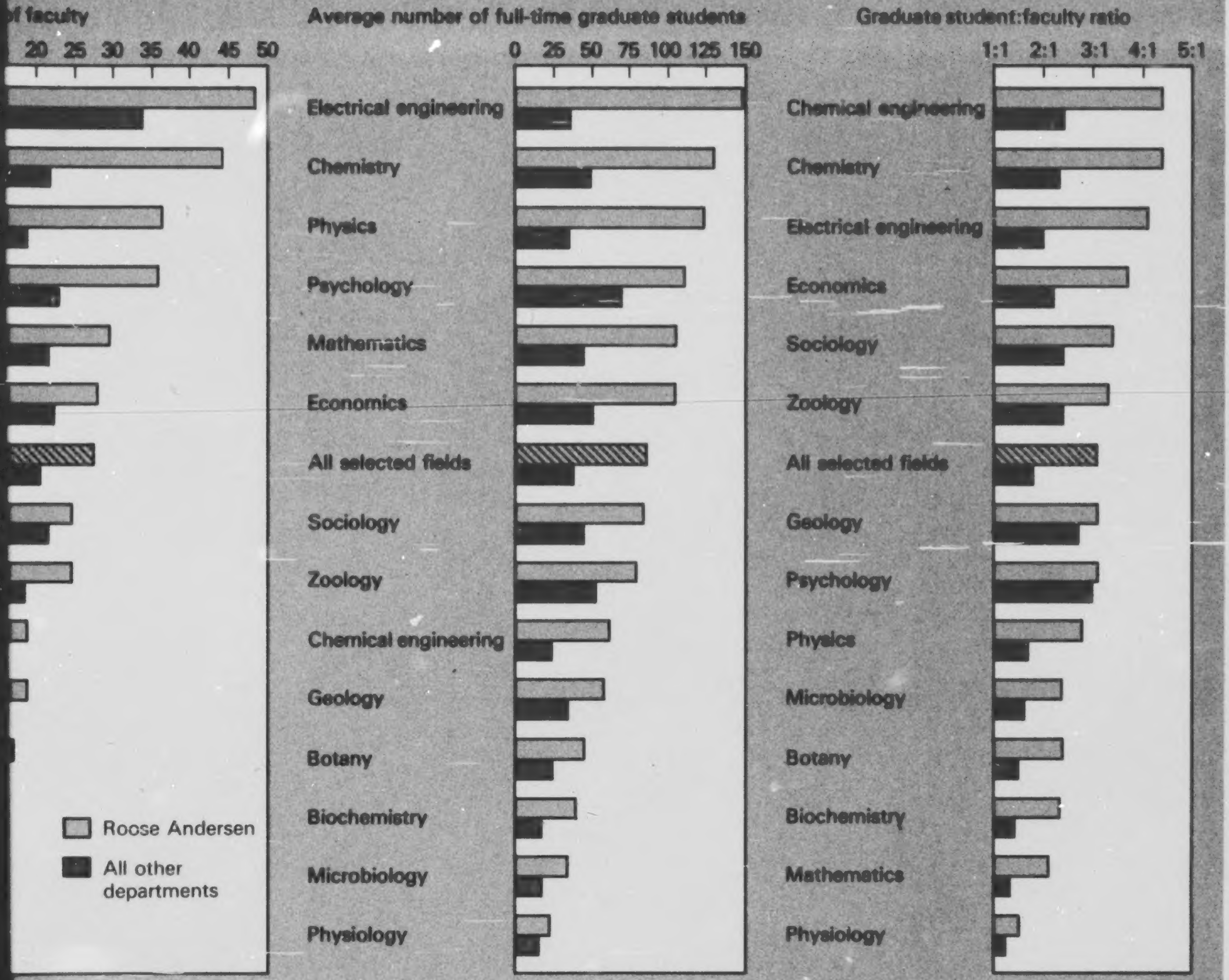
The unadjusted ratios of full-time graduate students to full-time faculty show for all fields except psychology substantially greater figures for the Roose-Andersen-rated departments. The service load, particularly at the undergraduate level, may account for much of the observed differences in ranks for Roose-Andersen-rated mathematics departments: First for average number of full-time faculty; fifth for average full-time graduate enrollment; and thirteenth for the unadjusted ratio of graduate students to faculty. Another dramatic difference is seen in the case of Roose-Andersen-rated departments of chemical engineering, which rank fourteenth (last) in average number of full-time faculty, ninth in average full-time graduate enrollment, and first in the unadjusted ratio of graduate students to faculty.

**Comparisons of "distinguished" and "strong" (Roose-Andersen) and all other do
science and engineering departments, by field.**



SOURCE: National Science Foundation

ns of "distinguished" and "strong" (Roose-Andersen) and all other doctorate-level science and engineering departments, by field.



Science Foundation

APPENDIXES

A. Methodology

B. Annotated Statistical Tables

C. Survey Instruments

APPENDIX A

Methodology

The survey institutions were selected from among the 229 that granted doctorates in 1970-71 by applying the following two criteria: (1) all institutions that awarded at least one doctorate in a science or engineering field in 1970-71[1] and (2) all institutions that received at least $1 million in Federal obligations for research and development in fiscal year 1972.[2] (The data used were the latest available at the time the selection of institutions was made.) The 160 colleges and universities that satisfied both criteria constituted the survey population of institutions. These 160 institutions accounted for 94.3 percent of the 18,466 science and engineering doctorates awarded in 1970-71, and 96.7 percent of the $1,751 million in total Federal obligations for research and development awarded in fiscal year 1972 to institutions granting doctorates in science and engineering fields.

The survey population included heads of doctorate-level departments in 15 selected science and engineering fields in the 160 institutions. The survey fields were biochemistry, biology, botany, chemical engineering, chemistry, economics, electrical engineering, geology, mathematics, microbiology, physics, physiology, psychology, sociology, and zoology. Together, these fields accounted for nearly two-thirds of all science and engineering doctorates awarded in 1970-71.

The number of eligible departments in the 160 survey institutions was estimated to be approximately 1,550 with approximately 73,600 full-time graduate students enrolled in the fall of 1973. The estimate of eligible doctorate-level departments in the 160 institutions was prepared by comparing the survey respondents with the list of departments covered by the Foundation's Survey of Graduate Science Student Support for Fall 1973. Because the Survey of Faculty Research Activities, Spring 1974, and the Survey of Graduate Science Student Support (GSSS), Fall 1973 were conducted during the same academic year, and because the 1973 GSSS survey included a total of 5,683 doctorate-level departments, this estimation procedure was believed to yield an adequate approximation of the population of eligible departments. Only those departments not represented in either survey were omitted. The estimate of fall 1973 full-time graduate enrollment was based principally on the 1973 GSSS survey. For the small number of departments that responded to the 1974 Survey of Faculty Research Activities but not to the 1973 GSSS survey, enrollment data were inputed using the 1972 GSSS survey and, where necessary, the U.S. Office of Education's Fall 1971 Survey of Enrollment for Advanced Degrees. Survey materials were mailed on April 29, 1974, to a coordinating official, frequently the
graduate dean, at each institution for distributio
15 selected fields. Separate mailings were made
ble departments. Replies were generally returne
(See appendix C for survey instruments.) Respo
ing the tabulations from 154 of the 160 institutio
cent. Some institutional responses, however, di
departments covered in responses to the Surv
88.0 percent of the total estimated number of e
ing departments accounted for 91.2 percent o
enrollment in the eligible departments. Similar c
science and engineering fields in table A-1, whi
percent for botany to 95.8 percent for sociolog
79.7 percent for botany to 96.9 percent for so
enrollment.

In addition to presenting data reported by a
selected items by (a) departments in private ins
(c) departments rated as "distinguished" or "st
Roose-Andersen study,[3] (d) the 20 largest res
terms of fall 1973 full-time graduate enrollmen
1974 survey and the similar NSF survey done

This report is based primarily on the informa
Exogenous data are those related to full-time g
institutional control, and selected items from
1969, and 1970. The departmental groupings ar
for the division by institutional control.

Data in the report represent only the respon
data for nonrespondents. During the editing of
the parentheses in items 1, 2, and 3, intended to
not been used by a substantial number of res
processing with extensive followup requests, t
the analysis. Typically, only departments co
microbiology, and physiology—indicated facul
D.Sc.

---

[1] Based on special NSF tabulations of U.S. Office of Education, Survey of Earned Degrees Conferred, 1970-71.

[2] Based on reports to the National Science Foundation derived from the Government-wide data system originally established under the auspices of the Committee on Academic Science and Engineering (CASE).

[3] Kenneth D. Roose and Charles J. Andersen. A
American Council on Education), 1970.

among the 229 that granted doctorates in 1970-71
nstitutions that awarded at least one doctorate in a
2) all institutions that received at least $1 million in
ment in fiscal year 1972.[2] (The data used were the
titutions was made.) The 160 colleges and univer-
he survey population of institutions. These 160 in-
3,466 science and engineering doctorates awarded
llion in total Federal obligations for research and
institutions granting doctorates in science and

octorate-level departments in 15 selected science
. The survey fields were biochemistry, biology,
economics, electrical engineering, geology,
iology, psychology, sociology, and zoology.
vo-thirds of all science and engineering doctorates

e 160 survey institutions was estimated to be ap-
full-time graduate students enrolled in the fall of
departments in the 160 institutions was prepared
e list of departments covered by the Foundation's
ort for Fall 1973. Because the Survey of Faculty
Survey of Graduate Science Student Support
same academic year, and because the 1973 GSSS
vel departments, this estimation procedure was
of the population of eligible departments. Only
survey were omitted. The estimate of fall 1973 full-
ly on the 1973 GSSS survey. For the small number
urvey of Faculty Research Activities but not to the
nputed using the 1972 GSSS survey and, where
1971 Survey of Enrollment for Advanced Degrees.
1974, to a coordinating official, frequently the

graduate dean, at each institution for distribution to heads of doctorate-level departments in the 15 selected fields. Separate mailings were made to medical schools to provide coverage of eligible departments. Replies were generally returned to the Foundation by the coordinating official. (See appendix C for survey instruments.) Responses were received in time to be used in preparing the tabulations from 154 of the 160 institutions, for an institutional response rate of 96.3 percent. Some institutional responses, however, did not include all eligible departments. The 1,366 departments covered in responses to the Survey of Faculty Research Activities represented 88.0 percent of the total estimated number of eligible departments. Furthermore, the responding departments accounted for 91.2 percent of the total estimated fall 1973 full-time graduate enrollment in the eligible departments. Similar comparisons are made for each of the 15 selected science and engineering fields in table A-1, which shows that response rates ranged from 76.0 percent for botany to 95.8 percent for sociology in terms of number of departments and from 79.7 percent for botany to 96.9 percent for sociology in terms of fall 1973 full-time graduate enrollment.

In addition to presenting data reported by all respondents, there are separate analyses for selected items by (a) departments in private institutions, (b) departments in public institutions, (c) departments rated as "distinguished" or "strong" in terms of graduate faculty quality in the Roose-Andersen study,[3] (d) the 20 largest responding departments in each of the 15 fields in terms of fall 1973 full-time graduate enrollment, and (e) departments represented in both the 1974 survey and the similar NSF survey done in 1968.

This report is based primarily on the information collected through the survey questionnaire. Exogenous data are those related to full-time graduate enrollment, quality of graduate faculty, institutional control, and selected items from surveys conducted by the Foundation in 1968, 1969, and 1970. The departmental groupings are based on departmental characteristics except for the division by institutional control.

Data in the report represent only the responding departments. There was no imputation of data for nonrespondents. During the editing of returned questionnaires, it was determined that the parentheses in items 1, 2, and 3, intended to collect data on faculty by kind of doctorate, had not been used by a substantial number of respondents. Rather than delay the questionnaire processing with extensive followup requests, the decision was made to use total doctorates in the analysis. Typically, only departments connected with medical schools—biochemistry, microbiology, and physiology—indicated faculty holding doctorates other than the Ph.D. or D.Sc.

---

e of Education, Survey of Earned Degrees Conferred,

dation derived from the Government-wide data system
nmittee on Academic Science and Engineering (CASE).

[3] Kenneth D. Roose and Charles J. Andersen. *A Rating of Graduate Programs.* (Washington, D.C.: American Council on Education), 1970.

Table A-1. Survey population and respondents by number of doctorate-level science and engineering departments and fall 1973 full-time graduate enrollment, by field

Field	Survey population		Responding departments			
	Number of departments	Full-time graduate enrollment	Departments		Graduate enrollment	
			Number	Percent	Number	Percent
All fields	1,553	73,559	1,366	88.0	67,106	91.2
Biochemistry	136	3,081	112	82.4	2,543	82.5
Biology	89	4,942	75	84.3	4,178	84.5
Botany	50	1,485	38	76.0	1,184	79.7
Chemical engineering	86	2,696	82	95.3	2,601	96.5
Chemistry	139	9,662	129	92.8	9,065	93.8
Economics	105	5,999	87	82.9	5,182	86.4
Electrical engineering	100	6,366	91	91.0	5,918	93.0
Geology	87	3,448	82	94.3	3,273	94.9
Mathematics	124	6,736	110	88.7	6,230	92.5
Microbiology	128	2,630	107	83.6	2,233	84.9
Physics	140	7,603	126	90.0	7,138	93.9
Physiology	104	1,718	84	80.8	1,388	80.8
Psychology	125	9,698	111	88.8	8,929	92.1
Sociology	95	4,903	91	95.8	4,750	96.9
Zoology	45	2,592	41	91.1	2,494	96.2

Source: National Science Foundation.

APPENDIX B.

Annotated Statistical Tables

TOTAL FACULTY

B-1. Composition of faculty in doctorate-level science and engineering departments, by years since doctorate: 1974 (all institutions) 20
B-2. Composition of faculty in doctorate-level science and engineering departments, by years since doctorate: 1974 (private institutions) 20
B-3. Composition of faculty in doctorate-level science and engineering departments, by years since doctorate: 1974 (public institutions) 21
B-4. Composition of faculty in doctorate-level science and engineering departments, by years since doctorate: 1974 (departments rated as "distinguished" or "strong" in Roose-Andersen study) 21
B-5. Composition of faculty in doctorate-level science and engineering departments, by years since doctorate: 1974 (20 largest departments in fall 1973 full-time graduate enrollment) 22
B-6. Composition of faculty in matched doctorate-level science and engineering departments, by years since doctorate: 1968 and 1974 23
B-7. Proportion of faculty in matched doctorate-level science and engineering departments, by years since doctorate: 1968 and 1974 23

TENURE

B-8. Proportion of faculty with tenure in doctorate-level science and engineering departments: 1974 (all institutions) 24
B-9. Proportion of faculty with tenure in doctorate-level science and engineering departments: 1974 (private institutions) 24
B-10. Proportion of faculty with tenure in doctorate-level science and engineering departments: 1974 (public institutions) 24
B-11. Proportion of faculty with tenure in doctorate-level science and engineering departments: 1974 (departments rated as "distinguished" or "strong" in Roose-Andersen study) 25
B-12. Proportion of faculty with tenure in doctorate-level science and engineering departments: 1974 (20 largest departments in fall 1973 full-time graduate enrollment) 25

RESEARCH ACTIVITY

B-13. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (all institutions) 26
B-14. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (private institutions). . 26
B-15. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (public institutions) .. 27
B-16. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (departments rated as "distinguished" or "strong" in Roose-Andersen study) 27
B-17. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (20 largest departments in fall 1973 full-time graduate enrollment) 28
B-18. Composition of faculty in matched doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1968 and 1974 28
B-19. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (all institutions) 29
B-20. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (private institutions) 29
B-21. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (public institutions) 29
B-22. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (departments rated as "distinguished" or "strong" in Roose-Andersen study) 30
B-23. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (20 largest departments in fall 1973 full-time graduate enrollment) 30
B-24. Proportion of faculty in matched doctorate-level science and engineering departments spending 20 percent or more of their time in research; 1968 and 1974 31

RESEARCH
SUPPORTED

B-25. Compo
science
researc
and co
B-26. Compo
science
researc
and co
B-27. Compo
science
researc
and co
B-28. Compo
science
researc
and co
guished
B-29. Compo
science
researc
and co
1973 fu
B-30. Compo
ate-leve
doing r
grants
B-31. Propor
science
researc
contrac
B-32. Propor
science
researc
and co
B-33. Propor
science
researc
and co
B-34. Propor
science
researc
and co
guished
B-35. Propor
science
researc
and co
full-time
B-36. Propor
ate-leve
doing r
grants

Tables

cience
ce
.... 20
cience
ce
.... 20
cience
ce
.... 21
cience
ce
stinguished"
.... 21
cience
nce
fall
.... 22
ate-
, by
.... 23
e-level
years
.... 23
rate-
:
.... 24
rate-
:
.... 24
rate-
:
.... 24
rate-
.
" or
.... 25
rate-
:
.... 25

RESEARCH ACTIVITY

B-13. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (all institutions) 26
B-14. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (private institutions). . 26
B-15. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (public institutions) .. 27
B-16. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (departments rated as "distinguished" or "strong" in Roose-Andersen study) 27
B-17. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (20 largest departments in fall 1973 full-time graduate enrollment) 28
B-18. Composition of faculty in matched doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1968 and 1974 28
B-19. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (all institutions) 29
B-20. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (private institutions) 29
B-21. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (public institutions) 29
B-22. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (departments rated as "distinguished" or "strong" in Roose-Andersen study) 30
B-23 Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (20 largest departments in fall 1973 full-time graduate enrollment) 30
B-24. Proportion of faculty in matched doctorate-level science and engineering departments spending 20 percent or more of their time in research; 1968 and 1974 31

RESEARCH CONNECTED WITH FEDERALLY SUPPORTED PROJECTS

B-25. Composition of faculty investigators in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (all institutions) 32
B-26. Composition of faculty investigators in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (private institutions) 32
B-27. Composition of faculty investigators in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (public institutions) 33
B-28. Composition of faculty investigators in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (departments rated as "distinguished" or "strong" in Roose-Andersen study) 33
B-29. Composition of faculty investigators in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (20 largest departments in fall 1973 full-time graduate enrollment) 34
B-30. Composition of faculty investigators in matched doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1968 and 1974 34
B-31. Proportion of faculty investigators in doctorate-level science and engineering departments who are doing research connected with Federal project grants and contracts: 1974 (all institutions) 35
B-32. Proportion of faculty investigators in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (private institutions) 35
B-33. Proportion of faculty investigators in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (public institutions) 36
B-34. Proportion of faculty investigators in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (departments rated as "distinguished" or "strong" in Roose-Andersen study) 36
B-35. Proportion of faculty investigators in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (20 largest departments in fall 1973 full-time graduate enrollment) 37
B-36. Proportion of faculty investigators in matched doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1968 and 1974 37

SOURCE OF RESEARCH FUNDS

B-37. Proportion of research funds coming to doctorate-level science and engineering departments from sources other than Federal research project funds: 1974 (all institutions) 38

APPROPRIATENESS OF SPLIT OF RESEARCH FUNDING

B-38. Appropriateness of the split of research funds between young and senior faculty in doctorate-level science and engineering departments: 1974 (all institutions) 39
B-39. Appropriateness of the split of research funds between young and senior faculty in doctorate-level science and engineering departments: 1974 (private institutions) 39
B-40. Appropriateness of the split of research funds between young and senior faculty in doctorate-level science and engineering departments: 1974 (public institutions) 40
B-41. Appropriateness of the split of research funds between young and senior faculty in doctorate-level science and engineering departments: 1974 (departments rated as "distinguished" or "strong" in Roose-Andersen study) 40
B-42. Appropriateness of the split of research funds between young and senior faculty in doctorate-level science and engineering departments: 1974 (20 largest departments in fall 1973 full-time graduate enrollment) 41
B-43. Appropriateness of the split of research funds between young and senior faculty in matched doctorate-level science and engineering departments: 1968 and 1974 41
B-44. Proportion of all research funds going to young faculty in doctorate-level science and engineering departments: 1974 (all institutions) 42
B-45. Opinions of heads of doctorate-level science and engineering departments concerning appropriate proportion of research funds for young faculty: 1974 (all institutions) 42

SUPPORT IN CHOSEN RESEARCH AREA

B-46. Opinions of heads of doctorate-level science and engineering departments concerning creation of special Federal research support programs specifically limited to young or senior faculty: 1974 (all institutions) 43
B-47. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators generally to secure support in research areas of their own choosing: 1974 (all institutions) 44
B-48. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators generally to secure support in research areas of their own choosing: 1974 (private institutions) ... 44
B-49. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators generally to secure support in research areas of their own choosing: 1974 (public institutions) 45
B-50. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators generally to secure support in research areas of their own choosing: 1974 (departments rated as "distinguished" or "strong" in Roose-Andersen study) 45
B-51. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators generally to secure support in research areas of their own choosing: 1974 (20 largest departments in fall 1973 full-time graduate enrollment) 46
B-52. Proportion of faculty investigators in doctorate-level science and engineering departments unable to secure support in research areas of own choosing: 1974 (all institutions) 47
B-53. Proportion of faculty investigators unable to secure support in research areas of own choosing who are in doctorate-level science and engineering departments where this is considered to be a major problem: 1974 (all institutions) 47

PARTICIPATION IN PROJECTS IN INDUSTRIAL OR GOVERNMENT LABORATORIES

B-54. Number of faculty investigators in doctorate-level science and engineering departments who participated in research projects at industrial or government laboratories: 1974 (all institutions) 48
B-55. Proportion of faculty investigators in doctorate-level science and engineering departments who participated in research projects at industrial or government laboratories: 1974 (all institutions) 48

TIME SPENT IN CLASSROOM TEACHING

B-56. Changes in time spent in classroom teaching by regular full-time faculty in doctorate-level science and engineering departments: 1970 to 1974 (all institutions) 49

CHARACTER ENGINEERIN

B-57. Compa science private fall 197
B-58. Compa and en institut full-tim
B-59. Compa and en "disting study b gradua
B-60. Distrib or "str
B-61. Compa and en full-tim ments
B-62. Compa and en depart 1963 fu
B-63. Averag studen engine institut
B-64. Averag studen engine instituti
B-65. Averag studen engine instituti
B-66. Averag studen engine rated a Roose-
B-67. Averag studen engine depart enrollm
B-68. Averag studen engine respon

B-47. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators generally to secure support in research areas of their own choosing: 1974 (all institutions) 44
B-48. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators generally to secure support in research areas of their own choosing: 1974 (private institutions) ... 44
B-49. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators generally to secure support in research areas of their own choosing: 1974 (public institutions) 45
B-50. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators generally to secure support in research areas of their own choosing: 1974 (departments rated as "distinguished" or "strong" in Roose-Andersen study) 45
B-51. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators generally to secure support in research areas of their own choosing: 1974 (20 largest departments in fall 1973 full-time graduate enrollment) 46
B-52. Proportion of faculty investigators in doctorate-level science and engineering departments unable to secure support in research areas of own choosing: 1974 (all institutions) 47
B-53. Proportion of faculty investigators unable to secure support in research areas of own choosing who are in doctorate-level science and engineering departments where this is considered to be a major problem: 1974 (all institutions) 47

PARTICIPATION IN PROJECTS IN INDUSTRIAL OR GOVERNMENT LABORATORIES

B-54. Number of faculty investigators in doctorate-level science and engineering departments who participated in research projects at industrial or government laboratories: 1974 (all institutions) 48
B-55. Proportion of faculty investigators in doctorate-level science and engineering departments who participated in research projects at industrial or government laboratories: 1974 (all institutions) 48

TIME SPENT IN CLASSROOM TEACHING

B-56. Changes in time spent in classroom teaching by regular full-time faculty in doctorate-level science and engineering departments: 1970 to 1974 (all institutions) 49

CHARACTERISTICS OF SCIENCE AND ENGINEERING DEPARTMENTS, 1973-74

B-57. Comparison of all responding doctorate-level science and engineering departments and those in private institutions by number of departments and fall 1973 full-time graduate enrollment 50
B-58. Comparison of all responding doctorate-level science and engineering departments and those in public institutions by number of departments and fall 1973 full-time graduate enrollment 50
B-59. Comparison of all responding doctorate-level science and engineering departments and those rated as "distinguished" or "strong" in the Roose-Andersen study by number of departments and fall 1973 full-time graduate enrollment 51
B-60. Distribution of departments rated as "distinguished" or "strong" in Roose-Andersen study 51
B-61. Comparison of all responding doctorate-level science and engineering departments and the 20 largest in full-time graduate enrollment by number of departments and fall 1973 full-time graduate enrollment ... 52
B-62. Comparison of all responding doctorate-level science and engineering departments and 1968-74 matched departments by number of departments and fall 1963 full-time graduate enrollment 52
B-63. Average number of faculty and full-time graduate students per doctorate-level science and engineering department: 1973-74 (all institutions) 53
B-64. Average number of faculty and full-time graduate students per doctorate-level science and engineering department: 1973-74 (private institutions) 53
B-65. Average number of faculty and full-time graduate students per doctorate-level science and engineering department: 1973-74 (public institutions) 54
B-66. Average number of faculty and full-time graduate students per doctorate-level science and engineering department: 1973-74 (departments rated as "distinguished" or "strong" in Roose-Andersen study) 54
B-67. Average number of faculty and full-time graduate students per doctorate-level science and engineering department: 1973-74 (20 largest departments in fall 1973 full-time graduate enrollment) 55
B-68. Average number of faculty and full-time graduate students per doctorate-level science and engineering department: 1973-74 (departments responding to both 1968 and 1974 surveys) 55

Table B-1. Composition of faculty in doctorate-level science and engineering departments, by years since doctorate: 1974 (All institutions)

- Fewer than 3 out of 10 of the faculty in the surveyed departments have held their doctorates for 7 years or less.
- The highest proportion of faculty in the "7 years or less" category is reported for sociology departments, the lowest for physics departments.
- Nearly two-thirds of the faculty without doctorates are in departments in four fields: mathematics, electrical engineering, economics, and sociology.

Field	Total number of faculty	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields	28,638	8,082	28.2	19,405	67.8	1,151	4.0
Biochemistry	1,516	315	20.8	1,181	77.9	20	1.3
Biology	1,969	496	25.2	1,424	72.3	49	2.5
Botany	636	150	23.6	457	71.9	29	4.6
Chemical engineering	891	188	21.1	661	74.2	42	4.7
Chemistry	3,056	645	21.1	2,366	77.4	45	1.5
Economics	2,020	703	34.8	1,177	58.3	140	6.9
Electrical engineering	2,082	534	25.6	1,319	63.4	229	11.0
Geology	1,145	281	24.5	835	72.9	29	2.5
Mathematics	4,064	1,403	34.5	2,411	59.3	250	6.2
Microbiology	1,209	321	26.6	848	70.1	40	3.3
Physics	3,356	612	18.2	2,678	79.8	66	2.0
Physiology	1,082	320	29.6	739	68.3	23	2.1
Psychology	2,917	1,100	37.7	1,778	61.0	39	1.3
Sociology	1,781	756	42.4	908	51.0	117	6.5
Zoology	914	258	28.2	623	68.2	33	3.6

Source: National Science Foundation.

Table B-2. Composition of facult engineering departments, by (Private In

- Departments in private institutions have torate faculty and a slightly lower propo departments combined.
- The greatest proportions of young d sociology departments.

Field	Total number of faculty	Ye
		7 year les
		Number
All fields[1]	8,006	2,256
Biochemistry	485	96
Biology	759	187
Chemical engineering	250	55
Chemistry	878	203
Economics	603	206
Electrical engineering	601	144
Geology	324	84
Mathematics	1,076	373
Microbiology	286	65
Physics	1,110	242
Physiology	381	100
Psychology	776	317
Sociology	418	175

[1] Includes botany and zoology departments small number.

Source: National Science Foundation.

lty in doctorate-level science and
y years since doctorate: 1974
titutions)

he surveyed departments have held their doc-

he "7 years or less" category is reported for
physics departments.

doctorates are in departments in four fields:
conomics, and sociology.

ears since doctorate			Without doctorate	
ars or ess	More than 7 years			
Percent	Number	Percent	Number	Percent
28.2	19,405	67.8	1,151	4.0
20.8	1,181	77.9	20	1.3
25.2	1,424	72.3	49	2.5
23.6	457	71.9	29	4.6
21.1	661	74.2	42	4.7
21.1	2,366	77.4	45	1.5
34.8	1,177	58.3	140	6.9
25.6	1,319	63.4	229	11.0
24.5	835	72.9	29	2.5
34.5	2,411	59.3	250	6.2
26.6	848	70.1	40	3.3
18.2	2,678	79.8	66	2.0
29.6	739	68.3	23	2.1
37.7	1,778	61.0	39	1.3
42.4	908	51.0	117	6.6
28.2	623	68.2	33	3.6

Table B-2. Composition of faculty in doctorate-level science and engineering departments, by years since doctorate: 1974
(Private institutions)

- Departments in private institutions have a slightly higher proportion of senior doctorate faculty and a slightly lower proportion of faculty without doctorates than all departments combined.
- The greatest proportions of young doctorate faculty are in psychology and sociology departments.

Field	Total number of faculty	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields[1]	8,006	2,256	28.2	5,505	68.8	245	3.1
Biochemistry	485	96	19.8	386	79.6	3	.6
Biology	759	187	24.6	564	74.3	8	1.1
Chemical engineering	250	55	22.0	189	75.6	6	2.4
Chemistry	878	203	23.1	671	76.4	4	.5
Economics	603	206	34.2	353	58.5	44	7.3
Electrical engineering	601	144	24.0	405	67.4	52	8.7
Geology	324	84	25.9	237	73.1	3	.9
Mathematics	1,076	373	34.7	653	60.7	50	4.6
Microbiology	286	65	22.7	214	74.8	7	2.4
Physics	1,110	242	21.8	851	76.7	17	1.5
Physiology	381	100	26.2	272	71.4	9	2.4
Psychology	776	317	40.9	448	57.7	11	1.4
Sociology	418	175	41.9	214	51.2	29	6.9

[1] Includes botany and zoology departments which are not separately reported because of the small number.

Source: National Science Foundation.

Table B-3. Composition of faculty in doctorate-level science and engineering departments, by years since doctorate: 1974 (Public institutions)

- Departments in public institutions have a slightly lower proportion of senior doctorate faculty and a slightly higher proportion of faculty without doctorates than all departments combined.
- The proportion of young doctorate faculty ranges from a low of 16.5 percent in physics departments to a high of 42.6 percent in sociology departments.

Field	Total number of faculty	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields	20,632	5,826	28.2	13,900	67.4	906	4.4
Biochemistry	1,031	219	21.2	795	77.1	17	1.6
Biology	1,210	309	25.5	860	71.1	41	3.4
Botany	610	148	24.3	433	71.0	29	4.8
Chemical engineering	641	133	20.7	472	73.6	36	5.6
Chemistry	2,178	442	20.3	1,695	77.8	41	1.9
Economics	1,417	497	35.1	824	58.2	96	6.8
Electrical engineering	1,481	390	26.3	914	61.7	177	12.0
Geology	821	197	24.0	598	72.8	26	3.2
Mathematics	2,988	1,030	34.5	1,758	58.8	200	6.7
Microbiology	923	256	27.7	634	68.7	33	3.6
Physics	2,246	370	16.5	1,827	81.3	49	2.2
Physiology	701	220	31.4	467	66.6	14	2.0
Psychology	2,141	783	36.6	1,330	62.1	28	1.3
Sociology	1,363	581	42.6	694	50.9	88	6.5
Zoology	881	251	28.5	599	68.0	31	3.5

Source: National Science Foundation.

Table B-4. Composition of facul engineering departments, by (Departments rated as "di Roose-And

- Compared with all departments, the R lower proportion of young doctorate fa higher proportion of senior doctorate fa a lower proportion of faculty without d

Field	Total number of faculty	Y
		7 yea le
		Number
All fields[1]	8,621	2,173
Biochemistry	469	59
Botany	241	48
Chemical engineering	226	54
Chemistry	1,013	200
Economics	446	155
Electrical engineering	833	183
Geology	372	75
Mathematics	1,165	390
Microbiology	359	92
Physics	1,272	232
Physiology	348	76
Psychology	1,070	337
Sociology	488	201
Zoology	319	71

[1] The Roose-Andersen study did not includ ent study.

Source: National Science Foundation.

lty in doctorate-level science and y years since doctorate: 1974 nstitutions)

e a slightly lower proportion of senior doc- portion of faculty without doctorates than all

aculty ranges from a low of 16.5 percent in percent in sociology departments.

Years since doctorate			Without doctorate	
ars or ess	More than 7 years			
Percent	Number	Percent	Number	Percent
28.2	13,900	67.4	906	4.4
21.2	795	77.1	17	1.6
25.5	860	71.1	41	3.4
24.3	433	71.0	29	4.8
20.7	472	73.6	36	5.6
20.3	1,695	77.8	41	1.9
35.1	824	58.2	96	6.8
26.3	914	61.7	177	12.0
24.0	598	72.8	26	3.2
34.5	1,758	58.8	200	6.7
27.7	634	68.7	33	3.6
16.5	1,827	81.3	49	2.2
31.4	467	66.6	14	2.0
36.6	1,330	62.1	28	1.3
42.6	694	50.9	88	6.5
28.5	599	68.0	31	3.5

Table B-4. Composition of faculty in doctorate-level science and engineering departments, by years since doctorate: 1974 (Departments rated as "distinguished" or "strong" in Roose-Andersen study)

- Compared with all departments, the Roose-Andersen-rated departments have a lower proportion of young doctorate faculty (25.2 percent versus 28.2 percent), a higher proportion of senior doctorate faculty (73.0 percent versus 67.8 percent), and a lower proportion of faculty without doctorates (1.8 percent versus 4.0 percent).

Field	Total number of faculty	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields[1]	8,621	2,173	25.2	6,296	73.0	152	1.8
Biochemistry	469	59	12.6	406	86.6	4	.9
Botany	241	48	19.9	192	79.7	1	.4
Chemical engineering	226	54	23.9	169	74.8	3	1.3
Chemistry	1,013	200	19.7	809	79.9	4	.4
Economics	446	155	34.8	271	60.8	20	4.5
Electrical engineering	833	183	22.0	592	71.1	58	7.0
Geology	372	75	20.2	295	79.3	2	.5
Mathematics	1,165	390	33.5	769	66.0	6	.5
Microbiology	359	92	25.6	252	70.2	15	4.2
Physics	1,272	232	18.2	1,035	81.4	5	.4
Physiology	348	76	21.8	266	76.4	6	1.7
Psychology	1,070	337	31.5	728	68.0	5	.5
Sociology	488	201	41.2	266	54.5	21	4.3
Zoology	319	71	22.3	246	77.1	2	.6

---

[1] The Roose-Andersen study did not include biology departments as designated in the present study.

Source: National Science Foundation.

Table B-5. Composition of faculty in doctorate-level science and engineering departments, by years since doctorate: 1974 (20 largest departments in fall 1973 full-time graduate enrollment)

- The 300 departments represented by these data, about 22 percent of all responding departments, account for nearly one-third of the faculty reported.
- These 300 departments have proportionately fewer young doctorate faculty and proportionately more senior doctorate faculty than reported for all departments combined.

Field	Total number of faculty	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields	9,379	2,429	25.9	6,697	71.4	253	2.7
Biochemistry	370	62	16.8	306	82.7	2	.5
Biology	773	165	21.3	584	75.5	24	3.1
Botany	382	80	20.9	289	75.7	13	3.4
Chemical engineering	294	66	22.4	221	75.2	7	2.4
Chemistry	710	135	19.0	571	80.4	4	.6
Economics	631	205	32.5	400	63.4	26	4.1
Electrical engineering	817	192	23.5	561	68.7	64	7.8
Geology	377	83	22.0	286	75.9	8	2.1
Mathematics	1,270	404	31.8	835	65.7	31	2.4
Microbiology	356	96	27.0	243	68.3	17	4.8
Physics	981	160	16.3	819	83.5	2	.2
Physiology	340	91	26.8	241	70.9	8	2.4
Psychology	975	316	32.4	651	66.8	8	.8
Sociology	569	238	41.8	309	54.3	22	3.9
Zoology	534	136	25.5	381	71.3	17	3.2

Source: National Science Foundation.

Table B-6. Composition of faculty in matched doctorate-level science and engineering departments, by years since doctorate: 1968 and 1974

- During the 6-year period, 1968-74, the number of faculty in the 602 matched departments has increased by 1,187 (8.4 percent), but nearly three-fourths of the increase is in four fields—psychology, mathematics, chemistry, and sociology.

- There is a marked change in the faculty composition. The number of young doctorate faculty declined by 1,349 (24.4 percent) while the number of senior doctorate faculty increased by 2,999 (39.5 percent). Faculty without doctorates decreased by 463 (46.9 percent).

Field	Number of departments	Total number of faculty		Number by years since doctorate				Number without doctorate	
				7 years or less		More than 7 years			
		1968	1974	1968	1974	1968	1974	1968	1974
All fields[1]	602	14,109	15,296	5,535	4,186	7,587	10,586	987	524
Biochemistry	31	452	535	144	99	292	431	16	5
Biology	32	689	798	211	213	443	563	35	22
Chemical engineering	52	569	576	207	124	321	432	41	20
Chemistry	103	2,387	2,555	805	526	1,522	1,995	60	34
Economics	45	1,107	1,131	418	355	564	697	125	79
Electrical engineering	61	1,527	1,523	651	366	603	1,011	273	146
Mathematics	69	2,651	2,849	1,242	989	1,167	1,746	242	114
Microbiology	22	258	290	73	60	171	218	14	12
Physics	77	2,162	2,190	826	400	1,262	1,759	74	31
Physiology	18	237	279	77	74	138	199	22	6
Psychology	58	1,411	1,798	603	663	789	1,123	19	12
Sociology	34	659	772	278	317	315	412	66	43

---

[1] Botany, geology, and zoology were not included in the 1968 survey and thus are omitted from this table.

Source: National Science Foundation.

Table B-7. Proportion of faculty in matched doctorate-level science and engineering departments, by years since doctorate: 1968 and 1974

- The overall proportion of young doctorate faculty has declined from 39.2 to 27.4 percent during the period 1968-74. In each field the 1974 proportion is below that of 1968 for the 602 matched departments.

- The proportion of faculty without doctorates has declined by about one-half.

- Senior doctorate faculty accounted for more than three-fourths of the faculty in biochemistry, chemical engineering, chemistry, microbiology, and physics in the 602 matched departments.

Field	Number	Total faculty	Percent by years since doctorate		Percent without doctorate
			7 years or less	More than 7 years	

Field	Number of departments	faculty		or less		7 years		doctorate	
		1968	1974	1968	1974	1968	1974	1968	1974
All fields[1]	602	14,109	15,296	5,535	4,186	7,587	10,586	987	524
Biochemistry	31	452	535	144	99	292	431	16	5
Biology	32	689	798	211	213	443	563	35	22
Chemical engineering	52	569	576	207	124	321	432	41	20
Chemistry	103	2,387	2,555	805	526	1,522	1,995	60	34
Economics	45	1,107	1,131	418	355	564	697	125	79
Electrical engineering	61	1,527	1,523	651	366	603	1,011	273	146
Mathematics	69	2,651	2,849	1,242	989	1,167	1,746	242	114
Microbiology	22	258	290	73	60	171	218	14	12
Physics	77	2,162	2,190	826	400	1,262	1,759	74	31
Physiology	18	237	279	77	74	138	199	22	6
Psychology	58	1,411	1,798	603	663	789	1,123	19	12
Sociology	34	659	772	278	317	315	412	66	43

[1] Botany, geology, and zoology were not included in the 1968 survey and thus are omitted from this table.

Source: National Science Foundation.

Table B-7. Proportion of faculty in matched doctorate-level science and engineering departments, by years since doctorate: 1968 and 1974

- The overall proportion of young doctorate faculty has declined from 39.2 to 27.4 percent during the period 1968-74. In each field the 1974 proportion is below that of 1968 for the 602 matched departments.
- The proportion of faculty without doctorates has declined by about one-half.
- Senior doctorate faculty accounted for more than three-fourths of the faculty in biochemistry, chemical engineering, chemistry, microbiology, and physics in the 602 matched departments.

Field	Number of departments	Total faculty		Percent by years since doctorate				Percent without doctorate	
				7 years or less		More than 7 years			
		1968	1974	1968	1974	1968	1974	1968	1974
All fields[1]	602	100.0	100.0	39.2	27.4	53.8	69.2	7.0	3.4
Biochemistry	31	100.0	100.0	31.9	18.5	64.6	80.6	3.5	.9
Biology	32	100.0	100.0	30.6	26.7	64.3	70.6	5.1	2.8
Chemical engineering	52	100.0	100.0	36.4	21.5	56.4	75.0	7.2	3.5
Chemistry	103	100.0	100.0	33.7	20.6	63.8	78.1	2.5	1.3
Economics	45	100.0	100.0	37.8	31.4	50.9	61.6	11.3	7.0
Electrical engineering	61	100.0	100.0	42.6	24.0	39.5	66.4	17.9	9.6
Mathematics	69	100.0	100.0	46.9	34.7	44.0	61.3	9.1	4.0
Microbiology	22	100.0	100.0	28.3	20.7	66.3	75.2	5.4	4.1
Physics	77	100.0	100.0	38.2	18.3	58.4	80.3	3.4	1.4
Physiology	18	100.0	100.0	32.5	26.5	58.2	71.3	9.3	2.2
Psychology	58	100.0	100.0	42.7	36.9	55.9	62.5	1.3	.7
Sociology	34	100.0	100.0	42.2	41.1	47.8	53.4	10.0	5.6

[1] Botany, geology and zoology were not included in the 1968 survey and thus are omitted from this table.

Source: National Science Foundation.

Table B-8. Proportion of faculty with tenure in doctorate-level science and engineering departments: 1974
(All institutions)

- Overall seven out of 10 faculty members in the departments reporting are tenured. The proportion of tenured faculty is greatest in chemical engineering departments, lowest in physiology departments.
- Fewer than one-fifth of the young doctorate faculty (i.e., seven years or less since doctorate) are tenured compared with over nine-tenths of senior doctorate faculty and over one-half of faculty without doctorates.
- More than 30 percent of the young doctorate faculty are tenured in chemical engineering and electrical engineering departments.
- More than 95 percent of the senior doctorate faculty are tenured in botany, chemical engineering, economics, electrical engineering, and geology departments.

Field	Percent with tenure			
	All faculty	Years since doctorate: 7 years or less	Years since doctorate: More than 7 years	Without doctorate
All fields	70.0	19.0	92.2	54.4
Biochemistry	65.8	7.6	81.9	30.0
Biology	68.7	12.1	89.7	32.7
Botany	77.2	24.7	97.2	34.5
Chemical engineering	80.7	33.5	95.2	64.3
Chemistry	77.1	15.2	94.1	68.9
Economics	67.4	24.5	96.9	35.7
Electircal engineering	77.4	30.9	95.1	83.8
Geology	74.9	16.7	95.4	48.3
Mathematics	67.0	18.6	94.9	68.4
Microbiology	64.8	15.9	84.8	35.0
Physics	77.7	15.5	92.0	74.2
Physiology	59.1	13.8	79.7	30.4
Psychology	62.9	15.6	93.0	25.6
Sociology	59.9	25.5	93.5	20.5
Zoology	71.1	20.9	94.9	15.2

Source: National Science Foundation.

Table B-9. Proportion of faculty with tenure in doctorate-level science and engineering departments: 1974
(Private institutions)

- Tenure percents for faculty in private institutions are substantially below those for public institutions, 65.2 percent compared to 71.9 percent.
- Only 10.0 percent of the young doctorate faculty in private institutions have tenure compared with 22.5 percent for those in public institutions.
- In only one field, chemical engineering, do more than 75 percent of the faculty have tenure.

Field	Percent with tenure			
	All faculty	Years since doctorate: 7 years or less	Years since doctorate: More than 7 years	Without doctorate
All fields[1]	65.2	10.0	88.3	53.9
Biochemistry	55.9	4.[illegible]	68.9	33.3
Biology	63.4	4.3	83.5	25.0
Chemical engineering	76.8	18.2	93.7	83.3
Chemistry	73.1	6.9	93.3	50.0
Economics	60.9	8.7	95.2	29.5
Electrical engineering	73.0	13.2	93.3	80.8
Geology	70.7	9.5	92.4	66.7
Mathematics	64.5	9.9	94.6	78.0
Microbiology	60.1	13.8	75.2	28.6
Physics	70.9	7.9	89.1	58.8
Physiology	53.3	14.0	68.0	44.4
Psychology	57.7	8.8	93.1	27.3
Sociology	59.6	20.6	96.3	24.1

[1] Includes botany and zoology departments which are not separately reported because of the small number.

Source: National Science Foundation.

Table B-10
doctor

- Tenure p
substanti
and reac
(i.e., thos
years).
- The perc
public ins
chemical
economi
- In six fiel
tenured
chemistr
physics.

Field
All fields
Biochemistry
Biology .....
Botany .....
Chemical
engineerin
Chemistry ..
Economics .
Electrical
engineering
Geology ....
Mathematics
Microbiology
Physics .....
Physiology .
Psychology .
Sociology ..
Zoology ....

Source: Natio

Table B-9. Proportion of faculty with tenure in doctorate-level science and engineering departments: 1974 (Private institutions)

- Tenure percents for faculty in private institutions are substantially below those for public institutions, 65.2 percent compared to 71.9 percent.
- Only 10.0 percent of the young doctorate faculty in private institutions have tenure compared with 22.5 percent for those in public institutions.
- In only one field, chemical engineering, do more than 75 percent of the faculty have tenure.

Field	Percent with tenure			
	All faculty	Years since doctorate: 7 years or less	Years since doctorate: More than 7 years	Without doctorate
All fields[1]	65.2	10.0	88.3	53.9
Biochemistry	55.9	4.2	68.9	33.3
Biology	63.4	4.3	83.5	25.0
Chemical engineering	76.8	18.2	93.7	83.3
Chemistry	73.1	6.9	93.3	50.0
Economics	60.9	8.7	95.2	29.5
Electrical engineering	73.0	13.2	93.3	80.8
Geology	70.7	9.5	92.4	66.7
Mathematics	64.5	9.9	94.6	78.0
Microbiology	60.1	13.8	75.2	28.6
Physics	70.9	7.9	89.1	58.8
Physiology	53.3	14.0	68.0	44.4
Psychology	57.7	8.8	93.1	27.3
Sociology	59.6	20.6	96.3	24.1

[1] Includes botany and zoology departments which are not separately reported because of the small number.

Source: National Science Foundation.

Table B-10. Proportion of faculty with tenure in doctorate-level science and engineering departments: 1974 (Public institutions)

- Tenure percents for faculty in public institutions are substantially above those for private institutions, and reach 93.7 percent for senior doctorate faculty (i.e., those who have held doctorates for more than 7 years).
- The percent of young doctorate-tenured faculty in public institutions exceeds 30 percent in three fields: chemical engineering, electrical engineering, and economics.
- In six fields, more than 75 percent of the faculty hold tenured positions: botany, chemical engineering, chemistry, electrical engineering, geology, and physics.

Field	Percent with tenure			
	All faculty	Years since doctorate: 7 years or less	Years since doctorate: More than 7 years	Without doctorate
All fields	71.9	22.5	93.7	54.5
Biochemistry	70.4	9.1	88.2	29.4
Biology	72.1	16.8	93.7	34.1
Botany	76.9	25.0	97.5	34.5
Chemical engineering	82.2	39.9	95.8	61.1
Chemistry	78.7	19.0	94.4	70.7
Economics	70.2	31.0	97.6	38.5
Electrical engineering	79.2	37.4	96.0	84.7
Geology	76.6	19.8	96.7	46.2
Mathematics	67.8	21.7	95.1	66.0
Microbiology	66.3	16.4	88.0	36.4
Physics	81.0	20.5	93.3	79.6
Physiology	62.3	13.6	86.5	21.4
Psychology	64.8	18.4	93.0	25.0
Sociology	59.9	27.0	92.7	19.3
Zoology	71.3	21.1	95.2	16.1

Source: National Science Foundation.

Table B-11. Proportion of faculty with tenure in doctorate-level science and engineering departments: 1974 (Departments rated as "distinguished" or "strong" in Roose-Andersen study)

- These departments have a somewhat higher overall proportion of tenured faculty than do all responding departments combined, 71.6 percent compared to 70.0 percent.
- The proportion of tenured faculty by field ranges from 61.5 percent for sociology to 82.6 percent for botany. In addition to botany, six other fields report 75 percent or more tenured faculty: chemical engineering, chemistry, electrical engineering, geology, physics, and zoology.

Field	Percent with tenure			
	All faculty	Years since doctorate: 7 years or less	Years since doctorate: More than 7 years	Without doctorate
All fields[1]	71.6	14.2	91.7	58.6
Biochemistry	65.2	5.1	74.6	0.0
Botany	82.6	27.1	96.9	0.0
Chemical engineering	79.6	25.9	96.5	100.0
Chemistry	75.6	4.5	93.1	100.0
Economics	65.2	12.3	97.4	40.0
Electrical engineering	78.0	12.6	97.0	91.4
Geology	77.2	10.7	94.2	50.0
Mathematics	70.9	19.0	97.1	83.3
Microbiology	66.0	25.0	82.9	33.3
Physics	76.0	8.2	91.3	60.0
Physiology	62.4	9.2	78.6	16.7
Psychology	65.0	11.9	89.8	20.0
Sociology	61.5	21.9	94.4	23.8
Zoology	77.7	16.9	95.9	0.0

[1] The Roose-Andersen study did not include biology departments as designated in the present study.

Source: National Science Foundation.

Table B-12. Proportion of faculty with tenure in doctorate-level science and engineering departments: 1974 (20 largest departments in fall 1973 full-time graduate enrollment)

- These 300 departments have a higher overall proportion of tenured faculty than the average for all responding departments, 72.4 percent compared with 70.0 percent.
- The proportion of tenured faculty ranges from 63.3 percent for sociology to 83.3 percent for chemical engineering.
- More than 75 percent of the faculty is tenured in the following fields: botany, chemical engineering, chemistry, electrical engineering, geology, and physics.

Field	Percent with tenure			
	All faculty	Years since doctorate: 7 years or less	Years since doctorate: More than 7 years	Without doctorate
All fields	72.4	18.1	92.9	51.8
Biochemistry	66.2	4.8	79.1	0.0
Biology	71.4	12.1	90.8	8.3
Botany	79.8	23.8	97.6	30.8
Chemical engineering	83.3	30.3	98.6	100.0
Chemistry	76.9	8.9	93.2	50.0
Economics	68.8	15.6	97.8	42.3
Electrical engineering	76.0	13.5	96.1	87.5
Geology	77.7	15.7	96.2	62.5
Mathematics	72.7	23.3	96.0	87.1
Microbiology	68.0	20.8	88.9	35.3
Physics	77.8	8.1	91.5	50.0
Physiology	65.6	18.7	85.1	12.5
Psychology	66.7	20.9	89.2	37.5
Sociology	63.3	23.1	97.1	22.7
Zoology	73.4	21.3	95.0	5.9

Source: National Science Foundation.

Table B-13. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (All institutions)

- Among faculty spending 20 percent or more of their time in research, three-tenths are young investigators (i.e., 7 years or less since their doctorates).
- The proportion of young investigators is lowest for physics departments (19.5 percent) and highest for sociology departments (42.5 percent).
- Over one-half of the nondoctorate faculty spending 20 percent or more of their time in research are in departments in three fields: sociology, electrical engineering, and economics.

Field	Total faculty spending 20 percent or more time in research	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields	23,949	7,203	30.1	16,345	68.2	401	1.7
Biochemistry	1,470	312	21.2	1,144	77.8	14	1.0
Biology	1,626	440	27.1	1,176	72.3	10	.6
Botany	529	135	25.5	381	72.0	13	2.5
Chemical engineering	768	172	22.4	567	73.8	29	3.8
Chemistry	2,639	603	22.8	2,031	77.0	5	.2
Economics	1,459	552	37.8	856	58.7	52	3.6
Electrical engineering	1,469	430	29.3	964	65.6	75	5.1
Geology	963	255	26.5	689	71.5	19	2.0
Mathematics	3,320	1,300	39.2	1,990	59.9	30	.9
Microbiology	1,098	313	28.5	773	70.4	12	1.1
Physics	3,034	592	19.5	2,421	79.8	21	.7
Physiology	1,021	309	30.3	696	68.2	16	1.6
Psychology	2,337	940	40.2	1,378	59.0	19	.8
Sociology	1,448	616	42.5	754	52.1	78	5.4
Zoology	768	235	30.6	525	68.4	8	1.0

Source: National Science Foundation.

Table B-14. Composition of facult engineering departments spending in researc (Private Ins

- Compared with the data for all institutions slightly lower proportion of young doct greater proportion of senior doctorate fa percent or more of their time in research

Field	Total faculty spending 20 percent or more time in research	Yea
		7 years less
		Number
All fields[1]	17,048	2,081
Biochemistry	476	96
Biology	667	165
Chemical engineering	222	51
Chemistry	789	191
Economics	485	178
Electrical engineering	489	134
Geology	300	81
Mathematics	952	360
Microbiology	267	65
Physics	1,024	237
Physiology	361	94
Psychology	631	279
Sociology	330	141

[1] Includes botany and zoology departments w small number.

Source: National Science Foundation.

lty in doctorate-level science and
ng 20 percent or more of their time
4 (All institutions)

more of their time in research, three-tenths
r less since their doctorates).

is lowest for physics departments (19.5 per-
ments (42.5 percent).

lty spending 20 percent or more of their time
fields: sociology, electrical engineering, and

ears since doctorate			Without doctorate	
ars or ss	More than 7 years			
Percent	Number	Percent	Number	Percent
30.1	16,345	68.2	401	1.7
21.2	1,144	77.8	14	1.0
27.1	1,176	72.3	10	.6
25.5	381	72.0	13	2.5
22.4	567	73.8	29	3.8
22.8	2,031	77.0	5	.2
37.8	856	58.7	52	3.6
29.3	964	65.6	75	5.1
26.5	689	71.5	19	2.0
39.2	1,990	59.9	30	.9
28.5	773	70.4	12	1.1
19.5	2,421	79.8	21	.7
30.3	696	68.2	16	1.6
40.2	1,378	59.0	19	.8
42.5	754	52.1	78	5.4
30.6	525	68.4	8	1.0

Table B-14. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974
(Private institutions)

- Compared with the data for all institutions, departments in private institutions have a slightly lower proportion of young doctorate faculty investigators and a slightly greater proportion of senior doctorate faculty investigators (i.e., those spending 20 percent or more of their time in research).

Field	Total faculty spending 20 percent or more time in research	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields[1]	17,048	2,081	29.5	4,847	68.8	120	1.7
Biochemistry	476	96	20.2	378	79.4	2	.4
Biology	667	165	24.7	499	74.8	8	.4
Chemical engineering	222	51	23.0	168	75.7	3	1.4
Chemistry	789	191	24.2	598	75.8	0	0.0
Economics	485	178	36.7	281	57.9	26	5.4
Electrical engineering	489	134	27.4	328	67.1	27	5.5
Geology	300	81	27.0	217	72.3	2	.7
Mathematics	952	360	37.8	583	61.2	9	1.0
Microbiology	267	65	24.3	197	73.8	5	1.9
Physics	1,024	237	23.1	778	76.0	9	.9
Physiology	361	94	26.0	260	72.0	7	1.9
Psychology	631	279	44.2	348	55.2	4	.6
Sociology	330	141	42.7	166	50.3	23	7.0

[1] Includes botany and zoology departments which are not separately reported because of the small number.

Source: National Science Foundation.

Table B-15. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (Public institutions)

- Compared with the data for all institutions, departments in public institutions have a slightly greater proportion of young doctorate faculty investigators and a slightly lower proportion of senior doctorate faculty investigators (i.e., those spending 20 percent or more of their time in research).

Field	Total faculty spending 20 percent or more time in research	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields	16,901	5,122	30.3	11,498	68.0	281	1.7
Biochemistry	994	216	21.7	766	77.1	12	1.2
Biology	959	275	28.7	677	70.6	7	.7
Botany	503	133	26.4	357	71.0	13	2.6
Chemical engineering ...	546	121	22.2	399	73.1	26	4.8
Chemistry	1,850	412	22.3	1,433	59.0	36	2.7
Economics	974	373	38.3	575	77.5	5	.3
Electrical engineering ...	980	296	30.2	636	64.9	48	4.9
Geology	663	174	26.2	472	71.2	17	2.6
Mathematics	2,368	940	39.7	1,407	59.4	21	.9
Microbiology	831	248	29.8	576	69.3	7	.8
Physics	2,010	355	17.7	1,643	81.7	12	.6
Physiology	660	215	32.6	436	66.1	9	1.4
Psychology	1,706	661	38.7	1,030	60.4	15	.9
Sociology	1,118	475	42.5	588	52.6	55	4.9
Zoology	739	228	30.9	503	68.1	8	1.1

Source: National Science Foundtion.

Table B-16. Composition of fac engineering departments spendi in research: 1974 (Departm "strong" in Roo

- The lower proportion of young doctor data for all departments, reflects the Andersen-rated departments rather th

Field	Total faculty spending 20 percent or more time in research	
		7 y
		Numbe
All fields[1]	7,857	2,081
Biochemistry	463	59
Botany	225	47
Chemical engineering ...	209	52
Chemistry	915	184
Economics	369	136
Electrical engineering ...	668	165
Geology	340	72
Mathematics	1,104	387
Microbiology	329	91
Physics	1,213	229
Physiology	334	75
Psychology	944	325
Sociology	451	190
Zoology	293	69

[1] The Roose-Andersen study did not inclu ent study.

Source: National Science Foundation.

culty in doctorate-level science and ending 20 percent or more of their research: 1974 institutions)

tions, departments in public institutions have a
doctorate faculty investigators and a slightly
faculty investigators (i.e., those spending 20
arch).

Years since doctorate				Without doctorate	
years or less		More than 7 years			
ber	Percent	Number	Percent	Number	Percent
22	30.3	11,498	68.0	281	1.7
16	21.7	766	77.1	12	1.2
75	28.7	677	70.6	7	.7
33	26.4	357	71.0	13	2.6
21	22.2	399	73.1	26	4.8
12	22.3	1,433	59.0	36	2.7
73	38.3	575	77.5	5	.3
96	30.2	636	64.9	48	4.9
74	26.2	472	71.2	17	2.6
30	39.7	1,407	59.4	21	.9
38	29.8	576	69.3	7	.8
55	17.7	1,643	81.7	12	.6
15	32.6	436	66.1	9	1.4
51	38.7	1,030	60.4	15	.9
75	42.5	588	52.6	55	4.9
28	30.9	503	68.1	8	1.1

Table B-16. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (Departments rated as "distinguished" or "strong" in Roose-Andersen study)

- The lower proportion of young doctorate faculty investigators, as compared to the data for all departments, reflects the overall composition of faculty in the Roose-Andersen-rated departments rather than a lower level of research activity.

Field	Total faculty spending 20 percent or more time in research	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields[1]	7,857	2,081	26.5	5,684	72.3	92	1.2
Biochemistry	463	59	12.7	400	86.4	4	.9
Botany	225	47	20.9	177	78.7	1	.4
Chemical engineering	209	52	24.9	154	73.7	3	1.4
Chemistry	915	184	20.1	730	79.8	1	.1
Economics	369	136	36.9	218	59.1	15	4.1
Electrical engineering	668	165	24.7	473	70.8	30	4.5
Geology	340	72	21.2	266	78.2	2	.6
Mathematics	1,104	387	35.1	714	64.7	3	.3
Microbiology	329	91	27.7	234	71.1	4	1.2
Physics	1,213	229	18.9	980	80.8	4	.3
Physiology	334	75	22.5	257	76.9	2	.6
Psychology	944	325	34.4	615	65.1	4	.4
Sociology	451	190	42.1	242	53.7	19	4.2
Zoology	293	69	23.5	224	76.5	0	0.0

[1] The Roose-Andersen study did not include biology departments as designated in the present study.

Source: National Science Foundation.

Table B-17. Composition of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (20 largest departments in fall 1973 full-time graduate enrollment)

- These 300 departments account for one-third of all faculty investigators (i.e., those spending 20 percent or more or their time in research), in keeping with their overall proportion of faculty.

Field	Total faculty spending 20 percent or more time in research	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields	7,966	2,188	27.5	5,674	71.2	104	1.3
Biochemistry	363	61	16.8	300	82.6	2	.6
Biology	640	149	23.3	485	75.8	6	.9
Botany	326	76	23.3	245	75.2	5	1.5
Chemical engineering	266	63	23.7	198	74.4	5	1.9
Chemistry	617	126	20.4	490	79.4	1	.2
Economics	491	173	25.2	304	61.9	14	2.9
Electrical engineering	629	174	27.7	430	68.4	25	4.0
Geology	307	72	23.5	228	74.3	7	2.3
Mathematics	1,049	352	33.6	696	66.3	1	.1
Microbiology	324	93	28.7	226	69.8	5	1.5
Physics	923	157	17.0	765	82.9	1	.1
Physiology	319	84	26.3	229	71.8	6	1.9
Psychology	754	268	35.5	480	63.7	6	.8
Sociology	508	219	43.1	273	53.7	16	3.2
Zoology	450	121	26.9	325	72.2	4	.9

Source: National Science Foundation.

Table B-18. Composition of faculty in matched doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1968 and 1974

- In general, the change in the composition of faculty spending 20 percent or more of their time in research reflects the change in overall composition of the faculty in these departments.
- The number of faculty investigators in 1974 is less than that for 1968 in only two fields—economics and electrical engineering.

Field	Number of	Total faculty spending 20 percent or more time in research	Number by years since doctorate		Number without doctorate
			7 years or less	More than 7 years	

	time in research	less Number	less Percent	years Number	years Percent	Number	Percent
All fields	7,966	2,188	27.5	5,674	71.2	104	1.3
Biochemistry	363	61	16.8	300	82.6	2	.6
Biology	640	149	23.3	485	75.8	6	.9
Botany	326	76	23.3	245	75.2	5	1.5
Chemical engineering	266	63	23.7	198	74.4	5	1.9
Chemistry	617	126	20.4	490	79.4	1	.2
Economics	491	173	25.2	304	61.9	14	2.9
Electrical engineering	629	174	27.7	430	68.4	25	4.0
Geology	307	72	23.5	228	74.3	7	2.3
Mathematics	1,049	352	33.6	696	66.3	1	.1
Microbiology	324	93	28.7	226	69.8	5	1.5
Physics	923	157	17.0	765	82.9	1	.1
Physiology	319	84	26.3	229	71.8	6	1.9
Psychology	754	268	35.5	480	63.7	6	.8
Sociology	508	219	43.1	273	53.7	16	3.2
Zoology	450	121	26.9	325	72.2	4	.9

Source: National Science Foundation.

Table B-18. Composition of faculty in matched doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1968 and 1974

- In general, the change in the composition of faculty spending 20 percent or more of their time in research reflects the change in overall composition of the faculty in these departments.
- The number of faculty investigators in 1974 is less than that for 1968 in only two fields—economics and electrical engineering.

Field	Number of departments	Total faculty spending 20 percent or more time in research		Number by years since doctorate				Number without doctorate	
				7 years or less		More than 7 years			
		1968	1974	1968	1974	1968	1974	1968	1974
All fields[1]	602	11,749	12,981	5,032	3,802	6,375	8,994	342	185
Biochemistry	31	441	527	142	99	284	424	15	4
Biology	32	587	661	191	186	384	469	12	6
Chemical engineering	52	469	511	177	119	275	377	17	15
Chemistry	103	2,062	2,218	776	488	1,277	1,725	9	5
Economics	45	908	862	372	292	453	538	83	32
Electrical engineering	61	1,083	1,078	525	298	470	733	88	46
Mathematics	69	2,137	2,416	1,154	918	954	1,478	29	20
Microbiology	22	236	269	72	59	156	207	8	3
Physics	77	1,956	2,024	812	394	1,130	1,621	14	9
Physiology	18	225	263	74	74	133	186	18	3
Psychology	58	1,134	1,465	510	585	616	872	8	8
Sociology	34	511	687	227	290	243	364	41	33

[1] Botany, geology, and zoology were not included in the 1968 survey and thus are omitted from this table.

Source: National Science Foundation.

Table B-19. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974
(All institutions)

- Overall, young doctorate faculty (i.e., those who have held doctorates for seven years or less) are the most active in research while those without doctorates are the least active.
- In four fields—biochemistry, physiology, microbiology, and physics—more than nine out of 10 faculty are spending 20 percent or more of their time in research.
- Economics and electrical engineering departments report the lowest proportion of faculty spending 20 percent or more of their time in research, just over seven out of 10.

Field	Percent spending 20 percent or more of time in research			
	All faculty	Years since doctorate		Without doctorate
		7 years or less	More than 7 years	
All fields	83.6	89.1	84.2	34.8
Biochemistry	97.0	99.0	96.9	70.0
Biology	82.6	88.7	82.6	20.4
Botany	83.2	90.0	83.4	44.8
Chemical engineering	86.2	91.5	85.8	69.0
Chemistry	86.4	93.5	85.8	11.1
Economics	72.2	78.4	72.7	37.1
Electrical engineering	70.6	80.5	73.1	32.8
Geology	84.1	90.7	82.5	65.5
Mathematics	81.7	92.7	82.5	12.0
Microbiology	90.8	97.5	91.2	30.0
Physics	90.4	96.7	90.4	31.8
Physiology	94.4	96.6	94.2	69.6
Psychology	80.1	85.5	77.5	48.7
Sociology	81.3	81.5	83.0	66.7
Zoology	84.0	91.1	84.3	24.2

Source: National Science Foundation.

Table B-20. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974
(Private institutions)

- The proportion of faculty spending 20 percent or more of their time in research is considerably higher for private institutions than public institutions (88.0 percent compared to 81.9 percent).
- For most fields in private institutions, greater proportions of young doctorate faculty than senior doctorate faculty are spending 20 percent or more of their time in research. The exceptions are biology and physiology.

Field	Percent spending 20 percent or more of time in research			
	All faculty	Years since doctorate		Without doctorate
		7 years or less	More than 7 years	
All fields[1]	88.0	92.2	88.0	49.0
Biochemistry	98.1	100.0	97.9	66.7
Biology	87.9	88.2	88.5	37.5
Chemical engineering	88.8	92.7	88.9	50.0
Chemistry	89.9	94.1	89.1	0.0
Economics	80.4	86.4	79.6	59.1
Electrical engineering	81.4	93.1	81.0	51.9
Geology	92.6	96.4	91.6	66.7
Mathematics	88.5	96.5	89.3	18.0
Microbiology	93.4	100.0	92.1	71.4
Physics	92.3	97.9	91.4	52.9
Physiology	94.8	94.0	95.6	77.8
Psychology	81.3	88.0	77.7	36.4
Sociology	78.9	80.6	77.6	79.3

[1] Includes botany and zoology departments which are not separately reported because of the small number.

Source: National Science Foundation.

faculty in
ngineering
ent or more
: 1974

(i.e., those who
rs or less) are the
ose without doc-

y, physiology,
than nine out of
t or more of their

ring departments
ulty spending 20
search, just over

g 20 percent or in research	
since rate	
More than 7 years	Without doctor-ate
84.2	34.8
96.9	70.0
82.6	20.4
83.4	44.8
85.8	69.0
85.8	11.1
72.7	37.1
73.1	32.8
82.5	65.5
82.5	12.0
91.2	30.0
90.4	31.8
94.2	69.6
77.5	48.7
83.0	66.7
84.3	24.2

Table B-20. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974
(Private institutions)

- The proportion of faculty spending 20 percent or more of their time in research is considerably higher for private institutions than public institutions (88.0 percent compared to 81.9 percent).
- For most fields in private institutions, greater proportions of young doctorate faculty than senior doctorate faculty are spending 20 percent or more of their time in research. The exceptions are biology and physiology.

Field	Percent spending 20 percent or more of time in research			
	All faculty	Years since doctorate		Without doctor-ate
		7 years or less	More than 7 years	
All fields[1]	88.0	92.2	88.0	49.0
Biochemistry	98.1	100.0	97.9	66.7
Biology	87.9	88.2	88.5	37.5
Chemical engineering	88.8	92.7	88.9	50.0
Chemistry	89.9	94.1	89.1	0.0
Economics	80.4	86.4	79.6	59.1
Electrical engineering	81.4	93.1	81.0	51.9
Geology	92.6	96.4	91.6	66.7
Mathematics	88.5	96.5	89.3	18.0
Microbiology	93.4	100.0	92.1	71.4
Physics	92.3	97.9	91.4	52.9
Physiology	94.8	94.0	95.6	77.8
Psychology	81.3	88.0	77.7	36.4
Sociology	78.9	80.6	77.6	79.3

[1] Includes botany and zoology departments which are not separately reported because of the small number.

Source: National Science Foundation.

Table B-21. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974
(Public institutions)

- Overall, and in individual fields, the proportions of faculty spending 20 percent or more of their time in research are lower for public institutions than for private institutions.
- In public institutions, greater proportions of young doctorate faculty than senior doctorate faculty are spending 20 percent or more of their time in research for all fields except sociology.

Field	Percent spending 20 percent or more of time in research			
	All faculty	Years since doctorate		Without doctor-ate
		7 years or less	More than 7 years	
All fields	81.9	87.9	82.7	31.0
Biochemistry	96.4	98.6	96.4	70.6
Biology	79.3	89.0	78.7	17.1
Botany	82.5	89.9	82.4	44.8
Chemical engineering	85.2	91.0	84.5	72.2
Chemistry	84.9	93.2	84.5	12.2
Economics	68.7	75.1	69.8	27.1
Electrical engineering	66.2	75.9	69.6	27.1
Geology	80.8	88.3	78.9	65.4
Mathematics	79.3	91.3	80.0	10.5
Microbiology	90.0	95.9	90.9	21.2
Physics	89.5	96.0	89.9	24.5
Physiology	94.2	97.7	93.4	64.3
Psychology	79.7	84.4	77.4	53.6
Sociology	82.0	81.8	84.7	62.5
Zoology	83.9	90.8	84.0	25.8

Source: National Science Foundation.

Table B-22. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (Departments rated as "distinguished" or "strong" in Roose-Andersen study)

- Departments rated as "distinguished" or "strong" in the Roose-Andersen study have greater proportions of faculty spending 20 percent or more of their time in research than other groups of departments.

Field	Percent spending 20 percent or more time in research			
	All faculty	Years since doctorate		Without doctorate
		7 years or less	More than 7 years	
All fields[1]	91.1	95.8	90.3	60.5
Biochemistry	98.7	100.0	98.5	100.0
Botany	93.4	97.9	92.2	100.0
Chemical engineering	92.5	96.3	91.1	100.0
Chemistry	90.3	92.0	90.2	25.0
Economics	82.7	87.7	80.4	75.0
Electrical engineering	80.2	90.2	79.9	51.7
Geology	91.4	96.0	90.2	100.0
Mathematics	94.8	99.2	92.8	50.0
Microbiology	91.6	98.9	92.9	26.7
Physics	95.4	98.7	94.7	80.0
Physiology	96.0	98.7	96.6	33.3
Psychology	88.2	96.4	84.5	80.0
Sociology	92.4	94.5	91.0	90.5
Zoology	91.8	97.2	91.1	0.0

[1] The Roose-Andersen study did not include biology departments as designated in the present study.

Source: National Science Foundation.

Table B-23. Proportion of facult and engineering departments spe their time in research: 1974 (fall 1973 full-time gra

- The overall proportion of faculty spendi research is less for these departments tha stitutions or for departments rated "dis Andersen study but is greater than for all

Field	Percent spending	
	All faculty	Ye
		7 years or
All fields	84.9	90.1
Biochemistry	98.1	98.4
Biology	82.8	90.3
Botany	85.3	95.0
Chemical engineering	90.5	95.5
Chemistry	86.9	93.3
Economics	77.8	84.4
Electrical engineering	77.0	90.6
Geology	81.4	86.7
Mathematics	82.6	87.1
Microbiology	91.0	96.9
Physics	94.1	98.1
Physiology	93.8	92.3
Psychology	77.3	84.8
Sociology	89.3	92.0
Zoology	84.3	89.0

Source: National Science Foundation.

lty in doctorate-level science
spending 20 percent or more
)74 (Departments rated as
in Roose-Andersen study)

"strong" in the Roose-Andersen study have
20 percent or more of their time in research

ng 20 percent or more time in research		
'ears since doctorate		Without
or less	More than 7 years	doctorate
.8	90.3	60.5
.0	98.5	100.0
.9	92.2	100.0
.3	91.1	100.0
.0	90.2	25.0
.7	80.4	75.0
.2	79.9	51.7
.0	90.2	100.0
.2	92.8	50.0
.9	92.9	26.7
.7	94.7	80.0
.7	96.6	33.3
.4	84.5	80.0
.5	91.0	90.5
.2	91.1	0.0

biology departments as designated in the pres-

Table B-23. Proportion of faculty in doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1974 (20 largest departments in fall 1973 full-time graduate enrollment)

- The overall proportion of faculty spending 20 percent or more of their time in research is less for these departments than for either all departments in private institutions or for departments rated "distinguished" or "strong" in the Roose-Andersen study but is greater than for all departments in public institutions.

Field	Percent spending 20 percent or more time in research			
	All faculty	Years since doctorate		Without doctorate
		7 years or less	More than 7 years	
All fields	84.9	90.1	84.7	41.1
Biochemistry	98.1	98.4	98.0	100.0
Biology	82.8	90.3	83.0	25.0
Botany	85.3	95.0	84.8	38.5
Chemical engineering	90.5	95.5	89.6	71.4
Chemistry	86.9	93.3	85.8	25.0
Economics	77.8	84.4	76.0	53.8
Electrical engineering	77.0	90.6	76.6	39.1
Geology	81.4	86.7	79.7	87.5
Mathematics	82.6	87.1	83.4	3.2
Microbiology	91.0	96.9	93.0	29.4
Physics	94.1	98.1	93.4	50.0
Physiology	93.8	92.3	95.0	75.0
Psychology	77.3	84.8	73.7	75.0
Sociology	89.3	92.0	88.3	72.7
Zoology	84.3	89.0	85.3	23.5

Source: National Science Foundation.

Table B-24. Proportion of faculty in matched doctorate-level science and engineering departments spending 20 percent or more of their time in research: 1968 and 1974

- Compared to 1968, there is a slightly greater overall proportion of faculty spending 20 percent or more of their time in research in 1974, but in the following fields the 1974 proportion is less than that for 1968: biology, chemistry, economics, and physiology. The fields with the greatest increases are chemical engineering, mathematics, and sociology.

Field	Number of departments	Percent spending 20 percent or more time in research							
		All faculty		Years since doctorate				Without doctorate	
				7 years or less		More than 7 years			
		1968	1974	1968	1974	1968	1974	1968	1974
All fields[1]	602	83.3	84.9	90.9	90.8	84.0	85.0	34.7	35.3
Biochemistry	31	97.6	98.5	98.6	100.0	97.3	98.4	93.8	80.0
Biology	32	85.2	82.8	90.5	87.3	86.7	83.3	34.3	27.3
Chemical engineering	52	82.4	88.7	85.5	96.0	85.7	87.3	41.5	75.0
Chemistry	103	86.4	80.7	96.4	92.8	83.9	86.5	15.0	14.7
Economics	45	82.0	76.2	89.0	82.3	80.3	77.2	66.4	40.5
Electrical engineering	61	70.9	70.8	80.6	81.4	77.9	72.5	32.2	32.2
Mathematics	69	80.6	84.8	92.9	92.8	81.7	84.7	12.0	17.5
Microbiology	22	91.5	92.8	98.6	96.3	91.2	95.0	57.1	25.0
Physics	77	90.5	92.4	98.3	98.5	89.5	92.2	18.9	29.0
Physiology	18	94.9	94.3	96.1	100.0	96.4	93.5	81.8	50.0
Psychology	58	80.4	81.5	84.6	88.2	78.1	77.6	42.1	66.7
Sociology	34	77.5	89.0	81.7	91.5	77.1	88.4	62.1	76.7

[1] Botany, geology, and zoology were not included in the 1968 survey and thus are omitted from this table.

Source: National Science Foundation

Table B-25. Composition of faculty investigators[1] in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (All institutions)

- Young faculty (i.e., those who have held doctorates for seven years or less) account for one-fourth of those spending at least 20 percent of their time in research and doing research directly connected with Federal project grants and contracts. This is somewhat below the percent of young faculty as a proportion of total faculty.
- Departments in five fields—physics, chemistry, mathematics, biochemistry, and electrical engineering—account for more than one-half (54.5 percent) of the faculty investigators doing research directly connected with Federal project grants and contracts.
- Faculty without doctorates make up only about 1 percent of those doing research directly connected with Federal projects.

Field	Faculty investigators doing research connected with Federal projects	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields	13,397	3,335	24.9	9,933	74.1	129	1.0
Biochemistry	1,141	224	19.6	908	79.6	9	.8
Biology	1,003	230	22.9	772	77.0	1	.1
Botany	224	39	17.4	183	81.7	2	.9
Chemical engineering	502	112	22.3	378	75.3	12	2.4
Chemistry	1,518	289	19.0	1,229	81.0	0	0.0
Economics	437	152	34.8	278	63.6	7	1.6
Electrical engineering	1,046	297	28.4	706	67.5	43	4.1
Geology	564	129	22.9	430	76.2	5	.9
Mathematics	1,407	481	34.2	923	65.6	3	.2
Microbiology	812	218	26.8	585	72.0	9	1.1
Physics	2,188	386	17.6	1,793	81.9	9	.4
Physiology	766	223	29.1	531	69.3	12	1.6
Psychology	1,009	289	28.6	716	71.0	4	.4
Sociology	382	147	38.5	223	58.4	12	3.1
Zoology	398	119	29.9	278	69.8	1	.3

[1] Those who are spending 20 percent or more of their time in research.

Source: National Science Foundation.

Table B-26. Composition of faculty science and engineering department connected with Federal project (Private inst

- Departments in four fields—physics, mathe for more than one-half (51.1 percent) of directly connected with Federal project g

Field	Faculty investigators doing research connected with Federal projects	Year	
		7 years less	
		Number	Pe
All fields[2]	4,727	1,212	
Biochemistry	402	72	
Biology	471	96	
Chemical engineering	164	33	
Chemistry	490	107	
Economics	186	66	
Electrical engineering	364	99	
Geology	211	47	
Mathematics	600	223	
Microbiology	223	49	
Physics	855	187	
Physiology	303	83	
Psychology	292	96	
Sociology	125	48	

[1] Those who are spending 20 percent or more

[2] Includes botany and zoology departments wh small number.

Source: National Science Foundation.

y investigators[1] in doctorate-level ments who are doing research roject grants and contracts: 1974 tutions)

doctorates for seven years or less) account 20 percent of their time in research and do- deral project grants and contracts. This is aculty as a proportion of total faculty.

emistry, mathematics, biochemistry, and than one-half (54.5 percent) of the faculty nected with Federal project grants and con-

y about 1 percent of those doing research s.

ars since doctorate			Without doctorate	
rs or s	More than 7 years			
Percent	Number	Percent	Number	Percent
24.9	9,933	74.1	129	1.0
19.6	908	79.6	9	.8
22.9	772	77.0	1	.1
17.4	183	81.7	2	.9
22.3	378	75.3	12	2.4
19.0	1,229	81.0	0	0.0
34.8	278	63.6	7	1.6
28.4	706	67.5	43	4.1
22.9	430	76.2	5	.9
34.2	923	65.6	3	.2
26.8	585	72.0	9	1.1
17.6	1,793	81.9	9	.4
29.1	531	69.3	12	1.6
28.6	716	71.0	4	.4
38.5	223	58.4	12	3.1
29.9	278	69.8	1	.3

re of their time in research.

Table B-26. Composition of faculty investigators[1] in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (Private institutions)

- Departments in four fields—physics, mathematics, chemistry, and biology—account for more than one-half (51.1 percent) of the faculty investigators doing research directly connected with Federal project grants and contracts.

Field	Faculty investigators doing research connected with Federal projects	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields[2]	4,727	1,212	25.6	3,470	73.4	45	1.0
Biochemistry	402	72	17.9	328	81.6	2	.5
Biology	471	96	20.4	375	79.6	0	0.0
Chemical engineering	164	33	20.1	130	79.3	1	.6
Chemistry	490	107	21.8	383	78.2	0	0.0
Economics	186	66	35.5	117	62.9	3	1.6
Electrical engineering	364	99	27.2	248	68.1	17	4.7
Geology	211	47	22.3	162	76.8	2	.9
Mathematics	600	223	37.2	375	62.5	2	.3
Microbiology	223	49	22.0	170	76.2	4	1.8
Physics	855	187	21.9	662	77.4	6	.7
Physiology	303	83	27.4	214	70.6	6	2.0
Psychology	292	96	32.9	195	66.8	1	.3
Sociology	125	48	38.4	76	60.8	1	.8

---

[1] Those who are spending 20 percent or more of their time in research.

[2] Includes botany and zoology departments which are not separately reported because of the small number.

Source: National Science Foundation.

Table B-27. Composition of faculty investigators[1] in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (Public institutions)

- Departments in five fields—physics, chemistry, mathematics, biochemistry, and psychology—account for more than one-half (53.3 percent) of the faculty investigators doing research directly connected with Federal project grants and contracts.

Field	Faculty investigators doing research connected with Federal projects	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields	8,670	2,123	24.5	6,463	74.5	84	1.0
Biochemistry	739	152	20.6	580	78.5	7	.9
Biology	532	134	25.2	397	74.6	1	.2
Botany	206	39	18.9	165	80.1	2	1.0
Chemical engineering	338	79	23.4	248	73.4	11	3.3
Chemistry	1,028	182	17.7	846	82.3	0	.0
Economics	251	86	34.3	161	64.1	4	1.6
Electrical engineering	682	198	29.0	458	67.2	26	3.8
Geology	353	82	23.2	268	75.9	3	.9
Mathematics	807	258	32.0	548	67.9	1	.1
Microbiology	589	169	28.7	415	70.5	5	.8
Physics	1,333	199	14.9	1,131	84.8	3	.2
Physiology	463	140	30.2	317	68.5	6	1.3
Psychology	717	193	26.9	521	72.7	3	.4
Sociology	257	99	38.5	147	57.2	11	4.3
Zoology	375	113	30.1	261	69.6	1	.3

[1] Those who are spending 20 percent or more of their time in research.

Source: National Science Foundation.

Table B-28. Composition of fac science and engineering departm connected with Federal project gr rated as "distinguished" or "

- Departments in three fields—physic nearly one-half (46.5 percent) of the connected with Federal project gran

Field	Faculty investigators doing research connected with Federal projects	
		7 y
		Numb
All fields[2]	5,691	1,31
Biochemistry	435	5
Botany	115	1
Chemical engineering	159	3
Chemistry	673	12
Economics	159	5
Electrical engineering	504	12
Geology	238	4
Mathematics	834	28
Microbiology	276	7
Physics	1,137	20
Physiology	295	5
Psychology	552	14
Sociology[3]	126	4
Zoology	188	4

[1] Those who are spending 20 percent or

[2] The Roose-Andersen study did not inclu ent study.

[3] Two departments, accounting for 15.3 Andersen-rated sociology departments, did n research connected with federally supported

Source: National Science Foundation.

culty investigators[1] in doctorate-level
tments who are doing research directly
project grants and contracts: 1974
c institutions)

s, chemistry, mathematics, biochemistry, and
an one-half (53.3 percent) of the faculty in-
connected with Federal project grants and con-

Years since doctorate				Without doctorate	
7 years or less		More than 7 years			
nber	Percent	Number	Percent	Number	Percent
123	24.5	6,463	74.5	84	1.0
152	20.6	580	78.5	7	.9
134	25.2	397	74.6	1	.2
39	18.9	165	80.1	2	1.0
79	23.4	248	73.4	11	3.3
182	17.7	846	82.3	0	.0
86	34.3	161	64.1	4	1.6
198	29.0	458	67.2	26	3.8
82	23.2	268	75.9	3	.9
258	32.0	548	67.9	1	.1
169	28.7	415	70.5	5	.8
199	14.9	1,131	84.8	3	.2
140	30.2	317	68.5	6	1.3
193	26.9	521	72.7	3	.4
99	38.5	147	57.2	11	4.3
113	30.1	261	69.6	1	.3

or more of their time in research.

Table B-28. Composition of faculty investigators[1] in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (Departments rated as "distinguished" or "strong" in Roose-Andersen study)

- Departments in three fields—physics, mathematics, and chemistry—account for nearly one-half (46.5 percent) of the faculty investigators doing research directly connected with Federal project grants and contracts.

Field	Faculty investigators doing research connected with Federal projects	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields[2]	5,691	1,312	23.1	4,342	76.3	37	0.7
Biochemistry	435	54	12.4	378	86.9	3	.7
Botany	115	12	10.4	103	89.6	0	0.0
Chemical engineering	159	39	24.5	120	75.5	0	0.0
Chemistry	673	122	18.1	551	81.9	0	0.0
Economics	159	59	37.1	99	62.3	1	.6
Electrical engineering	504	124	24.6	362	71.8	18	3.6
Geology	238	48	20.2	188	79.0	2	.8
Mathematics	834	280	33.6	552	66.2	2	.2
Microbiology	276	74	26.8	198	71.7	4	1.4
Physics	1,137	203	17.9	931	81.9	3	.3
Physiology	295	58	19.7	236	80.0	1	.3
Psychology	552	149	27.0	401	72.6	2	.4
Sociology[3]	126	45	35.7	80	63.5	1	.8
Zoology	188	45	23.9	143	76.1	0	0.0

[1] Those who are spending 20 percent or more of their time in research.

[2] The Roose-Andersen study did not include biology departments as designated in the present study.

[3] Two departments, accounting for 15.3 percent of the faculty investigators in the Roose-Andersen-rated sociology departments, did not provide data on the number of their faculty doing research connected with federally supported projects.

Source: National Science Foundation.

Table B-29. Composition of faculty investigators[1] in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (20 largest departments in fall 1973 full-time graduate enrollment)

- These departments account for almost four-tenths (38.7 percent) of the faculty investigators doing research connected with federally supported projects. This is a higher figure than their proportion of all faculty investigators (33.3 percent)

Field	Faculty investigators doing research connected with Federal projects	Years since doctorate				Without doctorate	
		7 years or less		More than 7 years			
		Number	Percent	Number	Percent	Number	Percent
All fields	5,183	1,224	23.6	3,925	75.7	34	0.7
Biochemistry	322	53	16.5	268	83.2	1	.3
Biology	454	96	21.1	358	78.9	0	0.0
Botany	163	22	13.5	139	85.3	2	1.2
Chemical engineering	184	41	22.3	141	76.6	2	1.1
Chemistry	455	95	20.9	360	79.1	0	0.0
Economics	190	64	33.7	124	65.3	2	1.1
Electrical engineering	492	131	26.6	346	70.3	15	3.0
Geology	164	36	22.0	127	77.4	1	.6
Mathematics	649	208	32.0	441	68.0	0	0.0
Microbiology	250	71	28.4	176	70.4	3	1.2
Physics	865	147	17.0	717	82.9	1	.1
Physiology	253	62	24.5	187	73.9	4	1.6
Psychology	377	85	22.5	291	77.2	1	.3
Sociology[2]	119	45	37.8	72	60.5	2	1.7
Zoology	246	68	27.6	178	72.4	0	0.0

[1] Those who are spending more than 20 percent of their time in research.

[2] Includes data for only 18 departments. The two departments not included account for 13.6 percent of the faculty investigators in the 20 sociology departments.

Source: National Science Foundation.

Table B-30. Composition of faculty investigators[1] in matched doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1968 and 1974

- The number of faculty investigators doing research directly connected with Federal project grants and contracts declined by 160 from 1968 to 1974 in spite of the fact that the number of faculty investigators increased by 1,232 during this period in these 602 departments.
- The increase for senior doctorate faculty investigators (i.e., those holding doctorates more than seven years) reflects the overall change in faculty composition in these departments.

Field	Number	Faculty investigators doing research connected with	Number by years since doctorate		Number without
			7 years or	More than 7	

All fields	5,183	1,224	23.6	3,925	75.7	34	0.7
Biochemistry	322	53	16.5	268	83.2	1	.3
Biology	454	96	21.1	358	78.9	0	0.0
Botany	163	22	13.5	139	85.3	2	1.2
Chemical engineering	184	41	22.3	141	76.6	2	1.1
Chemistry	455	95	20.9	360	79.1	0	0.0
Economics	190	64	33.7	124	65.3	2	1.1
Electrical engineering	492	131	26.6	346	70.3	15	3.0
Geology	164	36	22.0	127	77.4	1	.6
Mathematics	649	208	32.0	441	68.0	0	0.0
Microbiology	250	71	28.4	176	70.4	3	1.2
Physics	865	147	17.0	717	82.9	1	.1
Physiology	253	62	24.5	187	73.9	4	1.6
Psychology	377	85	22.5	291	77.2	1	.3
Sociology[2]	119	45	37.8	72	60.5	2	1.7
Zoology	246	68	27.6	178	72.4	0	0.0

[1] Those who are spending more than 20 percent of their time in research.

[2] Includes data for only 18 departments. The two departments not included account for 13.6 percent of the faculty investigators in the 20 sociology departments.

Source: National Science Foundation.

Table B-30. Composition of faculty investigators[1] in matched doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1968 and 1974

- The number of faculty investigators doing research directly connected with Federal project grants and contracts declined by 160 from 1968 to 1974 in spite of the fact that the number of faculty investigators increased by 1,232 during this period in these 602 departments.
- The increase for senior doctorate faculty investigators (i.e., those holding doctorates more than seven years) reflects the overall change in faculty composition in these departments.

Field	Number of departments	Faculty investigators doing research connected with Federal projects		Number by years since doctorate				Number without doctorate	
				7 years or less		More than 7 years			
		1968	1974	1968	1974	1968	1974	1968	1974
All fields[2]	602	7,596	7,436	2,942	1,813	4,524	5,565	130	58
Biochemistry	31	398	435	122	79	262	353	14	3
Biology	32	436	426	121	101	312	324	3	1
Chemical engineering	52	306	344	120	79	178	260	8	5
Chemistry	103	1,393	1,284	430	241	959	1,043	4	0
Economics	45	202	248	91	74	103	172	8	2
Electrical engineering	61	796	778	378	210	380	538	38	30
Mathematics	69	1,254	1,152	600	399	644	752	10	1
Microbiology	22	204	209	61	45	136	161	7	3
Physics	77	1,531	1,505	597	272	924	1,229	10	4
Physiology	18	198	210	63	57	117	150	18	3
Psychology	58	695	650	291	179	402	470	2	1
Sociology	34	183	195	68	77	107	113	8	5

[1] Those who are spending 20 percent or more of their time in research.

[2] Botany, geology, and zoology were not included in the 1968 survey and thus are omitted from this table.

Source: National Science Foundation.

Table B-31. Proportion of faculty investigators[1] in doctorate-level science and engineering departments who are doing research connected with Federal project grants and contracts: 1974

(All institutions)

- Overall, a substantially greater proportion of senior doctorate investigators, i.e., those who have held the doctorate for more than seven years, are doing research connected with Federal project grants and contracts compared with their young doctorate colleagues.
- More than seven out of 10 faculty investigators in the following departmental fields are doing research connected with federally supported projects: biochemistry, physiology, microbiology, physics, and electrical engineering, compared with fewer than three out of 10 in departments of economics and sociology.

Field	Percent connected with Federal projects				
	Faculty investigators	Years since doctorate			Without doctorate
		7 years or less (young)	More than 7 years (senior)	Ratio (senior÷young)	
All fields	55.9	46.3	60.8	1.31	32.2
Biochemistry	77.6	71.8	79.4	1.11	64.3
Biology	61.7	52.3	65.6	1.25	10.0
Botany	42.3	28.9	48.0	1.66	15.4
Chemical engineering	65.4	65.1	66.7	1.03	41.4
Chemistry	57.5	47.9	60.5	1.26	0.0
Economics	30.0	27.6	32.5	1.18	13.5
Electrical engineering	71.2	69.1	73.2	1.06	57.3
Geology	58.6	50.6	62.4	1.23	26.3
Mathematics	42.4	37.0	46.4	1.25	10.0
Microbiology	74.0	69.6	75.7	1.09	75.0
Physics	72.1	65.2	74.1	1.14	42.9
Physiology	75.0	72.2	76.3	1.06	75.0
Psychology	43.2	30.7	52.0	1.69	21.1
Sociology	26.4	23.9	29.6	1.24	15.4
Zoology	51.8	50.6	53.0	1.05	12.5

[1] Those who are spending 20 percent or more of their time in research.

Source: National Science Foundation.

Table B-32. Proportion of faculty
and engineering departments wh
with Federal project
(Privat

- Departments in private institutions vestigators doing research connec those in public institutions (67 perc
- More than five out of six faculty in federally supported projects in the physics, and physiology.

Field	Faculty investigators
All fields[2]	67.1
Biochemistry	84.5
Biology	70.6
Chemical engineering	73.9
Chemistry	62.1
Economics	38.4
Electrical engineering	74.4
Geology	70.3
Mathematics	63.0
Microbiology	83.5
Physics	83.5
Physiology	83.9
Psychology	46.3
Sociology	37.9

[1] Those spending 20 percent or more o

[2] Includes botany and zoology departm small number.

Source: National Science Foundation.

y investigators[1] in doctorate-level science
o are doing research connected with Federal
s and contracts: 1974
institutions)

oportion of senior doctorate investigators, i.e.,
for more than seven years, are doing research
ants and contracts compared with their young

nvestigators in the following departmental fields
ith federally supported projects: biochemistry,
and electrical engineering, compared with fewer
s of economics and sociology.

Percent connected with Federal projects			
Years since doctorate			
7 years or less (young)	More than 7 years (senior)	Ratio (senior÷young)	Without doctorate
46.3	60.8	1.31	32.2
71.8	79.4	1.11	64.3
52.3	65.6	1.25	10.0
28.9	48.0	1.66	15.4
65.1	66.7	1.03	41.4
47.9	60.5	1.26	0.0
27.6	32.5	1.18	13.5
69.1	73.2	1.06	57.3
50.6	62.4	1.23	26.3
37.0	46.4	1.25	10.0
69.6	75.7	1.09	75.0
65.2	74.1	1.14	42.9
72.2	76.3	1.06	75.0
30.7	52.0	1.69	21.1
23.9	29.6	1.24	15.4
50.6	53.0	1.05	12.5

or more of their time in research

Table B-32. Proportion of faculty investigators[1] in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974
(Private institutions)

- Departments in private institutions report a much higher proportion of faculty investigators doing research connected with federally supported projects than do those in public institutions (67 percent compared to 51.3 percent).
- More than five out of six faculty investigators are doing research connected with federally supported projects in the following fields: biochemistry, microbiology, physics, and physiology.

Field	Percent connected with Federal projects				
	Faculty investigators	Years since doctorate			Without doctorate
		7 years or less (young)	More than 7 years (senior)	Ratio (senior÷young)	
All fields[2]	67.1	58.2	71.6	1.23	37.5
Biochemistry	84.5	75.0	86.8	1.16	100.0
Biology	70.6	58.2	75.2	1.29	0.0
Chemical engineering	73.9	64.7	77.4	1.20	33.3
Chemistry	62.1	56.0	64.0	1.15	0.0
Economics	38.4	37.1	41.6	1.12	11.5
Electrical engineering	74.4	73.9	75.6	1.02	63.0
Geology	70.3	58.0	74.7	1.29	100.0
Mathematics	63.0	61.9	64.3	1.04	22.2
Microbiology	83.5	75.4	86.3	1.15	40.0
Physics	83.5	78.9	85.1	1.08	44.4
Physiology	83.9	88.3	82.3	0.93	85.7
Psychology	46.3	34.4	56.0	1.63	25.0
Sociology	37.9	34.0	45.8	1.35	4.4

[1] Those spending 20 percent or more of their time in research.

[2] Includes botany and zoology departments which are not separately reported because of the small number.

Source: National Science Foundation.

Table B-33. Proportion of faculty investigators[1] in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (Public institutions)

- Overall, only slightly more than one-half of the faculty investigators in public institutions are doing research connected with federally supported projects. In terms of individual fields, the highest proportion is in biochemistry, the lowest in sociology.
- In all fields except chemical engineering a greater proportion of senior investigators than young investigators are doing research connected with federally supported projects.

Field	Percent connected with Federal projects				
	Faculty investigators	Years since doctorate			Without doctorate
		7 years or less (young)	More than 7 years (senior)	Ratio (senior÷young)	
All fields	51.3	41.4	56.2	1.36	29.9
Biochemistry	74.3	70.4	75.7	1.08	58.3
Biology	55.5	48.7	58.6	1.20	14.3
Botany	41.0	29.3	46.2	1.58	15.4
Chemical engineering	61.9	65.3	62.2	.95	42.3
Chemistry	55.6	44.2	59.0	1.34	0.0
Economics	25.8	23.1	28.0	1.21	15.4
Electrical engineering	69.6	66.9	72.0	1.08	54.2
Geology	53.2	47.1	56.8	1.27	17.6
Mathematics	34.1	27.4	38.9	1.42	4.8
Microbiology	70.9	68.1	72.0	1.06	71.4
Physics	66.3	56.1	68.8	1.23	25.0
Physiology	70.2	65.1	72.7	1.12	66.7
Psychology	42.0	29.2	50.6	1.73	20.0
Sociology	23.0	20.8	25.0	1.20	20.0
Zoology	50.7	49.6	51.9	1.05	12.5

---

[1] Those spending 20 percent or more of their time in research.

Source: National Science Foundation.

Table B-34. Proportion of faculty in science and engineering departments connected with Federal project (Departments rated as "distin Roose-Anders

- A much greater proportion of faculty inve departments doing research connected with departments in general (72.4 percent comp

Field	Percent	
	Faculty investigators	7 yea les (you
All fields[2]	72.4	63.
Biochemistry	94.0	91.
Botany	51.1	25.
Chemical engineering	76.1	75.
Chemistry	73.6	66.
Economics	43.1	43.
Electrical engineering	75.4	75.
Geology	70.0	66.
Mathematics	75.5	72.
Microbiology	83.9	81.
Physics	93.7	88.
Physiology	88.3	77.
Psychology	58.5	45.
Sociology	27.9	23.
Zoology	64.2	65.

---

[1] Those spending 20 percent or more of their ti

[2] The Roose-Andersen study did not include bio ent study.

Source: National Science Foundation.

investigators[1] in doctorate-level ts who are doing research directly ct grants and contracts: 1974 stitutions)

lf of the faculty investigators in public in- with federally supported projects. In terms is in biochemistry, the lowest in sociology.

a greater proportion of senior investigators earch connected with federally supported

nt connected with Federal projects			
Years since doctorate			
ears or less oung)	More than 7 years (senior)	Ratio (senior÷ young)	Without doctorate
41.4	56.2	1.36	29.9
70.4	75.7	1.08	58.3
48.7	58.6	1.20	14.3
29.3	46.2	1.58	15.4
65.3	62.2	.95	42.3
44.2	59.0	1.34	0.0
23.1	28.0	1.21	15.4
66.9	72.0	1.08	54.2
47.1	56.8	1.27	17.6
27.4	38.9	1.42	4.8
68.1	72.0	1.06	71.4
56.1	68.8	1.23	25.0
65.1	72.7	1.12	66.7
29.2	50.6	1.73	20.0
20.8	25.0	1.20	20.0
49.6	51.9	1.05	12.5

r time in research.

Table B-34. Proportion of faculty investigators[1] in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (Departments rated as "distinguished" or "strong" in Roose-Andersen study)

- A much greater proportion of faculty investigators in the Roose-Andersen-rated departments doing research connected with federally supported projects than for all departments in general (72.4 percent compared to 55.9 percent).

Field	Percent connected with Federal projects				
		Years since doctorate			
	Faculty investigators	7 years or less (young)	More than 7 years (senior)	Ratio (senior÷ young)	Without doctorate
All fields[2]	72.4	63.0	76.4	1.22	40.2
Biochemistry	94.0	91.5	94.5	1.03	75.0
Botany	51.1	25.5	58.2	2.28	0.0
Chemical engineering	76.1	75.0	77.9	1.04	0.0
Chemistry	73.6	66.3	75.5	1.14	0.0
Economics	43.1	43.4	45.4	1.05	6.7
Electrical engineering	75.4	75.2	76.5	1.02	60.0
Geology	70.0	66.7	70.7	1.19	100.0
Mathematics	75.5	72.4	77.3	1.07	66.7
Microbiology	83.9	81.3	84.6	1.04	100.0
Physics	93.7	88.6	95.0	1.07	75.0
Physiology	88.3	77.3	91.8	1.19	50.0
Psychology	58.5	45.8	65.2	1.42	50.0
Sociology	27.9	23.7	33.1	0.98	5.3
Zoology	64.2	65.2	63.8	0.98	0.0

[1] Those spending 20 percent or more of their time in research.

[2] The Roose-Andersen study did not include biology departments as designated in the present study.

Source: National Science Foundation.

Table B-35. Proportion of faculty investigators[1] in doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1974 (20 largest departments in fall 1973 full-time graduate enrollment)

- For these 300 departments the proportion of faculty investigators doing research directly connected with federally supported projects is substantially greater than the figure for all responding departments combined, 65.1 percent compared to 55.9 percent.

Field	Percent connected with Federal projects				
	Faculty investigators	Years since doctorate			Without doctorate
		7 years or less (young)	More than 7 years (senior)	Ratio (senior÷young)	
All fields	65.1	55.9	69.2	1.24	32.7
Biochemistry	88.7	86.9	89.3	1.03	50.0
Biology	70.9	64.4	73.8	1.15	0.0
Botany	50.0	28.9	56.7	1.96	40.0
Chemical engineering	69.2	65.1	71.2	1.09	40.0
Chemistry	73.7	75.4	73.5	.97	0.0
Economics	38.7	37.0	40.8	1.10	14.3
Electrical engineering	78.2	75.3	80.5	1.07	60.0
Geology	53.4	50.0	55.7	1.26	14.3
Mathematics	61.9	59.1	63.4	1.07	60.0
Microbiology	77.2	76.3	77.9	1.02	60.0
Physics	93.7	93.6	93.7	1.00	100.0
Physiology	79.3	73.8	81.7	1.11	66.7
Psychology	50.0	31.7	60.6	1.91	16.7
Sociology	23.4	20.5	26.4	1.29	12.5
Zoology	54.7	56.2	54.8	.98	0.0

[1] Those spending 20 percent or more of their time in research.

Source: National Science Foundation.

Table B-36. Proportion of faculty investigators[1] in matched doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1968 and 1974

- Compared with 1968, the data for 1974 show a substantial decline in the overall proportion of faculty investigators doing research directly connected with federally supported projects. However, in the fields of chemical engineering and economics, the 1974 proportions are greater than those for 1968.

Field	Number of	Percent connected with Federal projects				
		Faculty investigators	Years since doctorate			Without doctorate
			7 years or less (young)	More than 7 years (senior)	Ratio (senior÷young)	

	investigators	(young)	(senior)	young)	doctorate
All fields	65.1	55.9	69.2	1.24	32.7
Biochemistry	88.7	86.9	89.3	1.03	50.0
Biology	70.9	64.4	73.8	1.15	0.0
Botany	50.0	28.9	56.7	1.96	40.0
Chemical engineering	69.2	65.1	71.2	1.09	40.0
Chemistry	73.7	75.4	73.5	.97	0.0
Economics	38.7	37.0	40.8	1.10	14.3
Electrical engineering	78.2	75.3	80.5	1.07	60.0
Geology	53.4	50.0	55.7	1.26	14.3
Mathematics	61.9	59.1	63.4	1.07	60.0
Microbiology	77.2	76.3	77.9	1.02	60.0
Physics	93.7	93.6	93.7	1.00	100.0
Physiology	79.3	73.8	81.7	1.11	66.7
Psychology	50.0	31.7	60.6	1.91	16.7
Sociology	23.4	20.5	26.4	1.29	12.5
Zoology	54.7	56.2	54.8	.98	0.0

[1] Those spending 20 percent or more of their time in research.
Source: National Science Foundation.

Table B-36. Proportion of faculty investigators[1] in matched doctorate-level science and engineering departments who are doing research directly connected with Federal project grants and contracts: 1968 and 1974

- Compared with 1968, the data for 1974 show a substantial decline in the overall proportion of faculty investigators doing research directly connected with federally supported projects. However, in the fields of chemical engineering and economics, the 1974 proportions are greater than those for 1968.

Field	Number of departments	Percent connected with Federal projects									
		Faculty investigators		Years since doctorate						Without doctorate	
				7 years or less (young)		More than 7 years (senior)		Ratio (senior÷young)			
		1968	1974	1968	1974	1968	1974	1968	1974	1968	1974
All fields[2]	602	64.7	57.3	58.5	47.7	71.0	61.9	1.21	1.30	38.0	31.4
Biochemistry	31	90.2	82.5	85.9	79.8	92.3	83.3	1.07	1.04	93.3	75.0
Biology	32	74.3	64.4	63.4	54.3	81.3	69.1	1.28	1.27	25.0	16.7
Chemical engineering	52	65.2	67.3	67.8	66.4	64.7	69.0	0.95	1.04	47.1	33.3
Chemistry	103	67.6	57.9	55.4	49.4	75.1	60.5	1.36	1.22	44.4	0.0
Economics	45	22.2	28.8	24.5	25.3	22.7	32.0	1.56	1.26	9.6	6.3
Electrical engineering	61	73.5	72.2	72.0	70.5	80.9	73.4	1.12	1.04	43.2	63.8
Mathematics	69	58.7	47.7	52.0	43.5	67.5	50.9	1.30	1.17	34.5	5.0
Microbiology	22	86.4	77.7	84.7	76.3	87.2	77.8	1.03	1.02	87.5	100.0
Physics	77	78.3	74.4	73.5	69.0	81.8	75.8	1.11	1.10	71.4	44.4
Physiology	18	88.0	79.9	85.1	77.0	88.0	80.6	1.03	1.05	100.0	100.0
Psychology	58	61.3	44.4	57.1	30.6	65.3	53.9	1.14	1.76	25.0	12.5
Sociology	34	35.8	28.4	30.0	26.6	44.0	31.0	1.47	1.17	19.5	15.2

[1] Those spending 20 percent or more of their time in research.
[2] Botany, geology, and zoology were not included in the 1968 survey and thus are omitted from this table.
Source: National Science Foundation.

Table B-37. Proportion of research funds coming to doctorate-level science and engineering departments from sources other than Federal research project funds: 1974
(All institutions)

- For all but 17 percent of the departments, Federal research project funds account for more than one-half of all research funds available.
- The greatest proportion of departments re that one-half or more of their research fund from sources other than Federal research funds are economics, 35.6 percent; sociolog percent; and botany, 31.6 percent.

Field and proportion of research funds coming from sources other than Federal research project funds	Number of departments	Percent
All fields	[1]1,361	100.0
Less than 10 percent	534	39.2
10 to 29 percent	422	31.0
30 to 49 percent	173	12.7
50 percent or more	232	17.0
Biochemistry	112	100.0
Less than 10 percent	44	39.3
10 to 29 percent	44	39.3
30 to 49 percent	11	9.8
50 percent or more	13	11.6
Biology	75	100.0
Less than 10 percent	30	40.0
10 to 29 percent	32	42.7
30 to 49 percent	5	6.7
50 percent or more	8	10.7
Botany	38	100.0
Less than 10 percent	14	36.8
10 to 29 percent	6	15.8
30 to 49 percent	6	15.8
50 percent or more	12	31.6
Chemical engineering	82	100.0
Less than 10 percent	8	9.8
10 to 29 percent	38	46.3
30 to 49 percent	21	25.6
50 percent or more	15	18.3
Chemistry	128	100.0
Less than 10 percent	24	18.8
10 to 29 percent	59	46.1
30 to 49 percent	26	20.3
50 percent or more	19	14.8
Economics	87	100.0
Less than 10 percent	22	25.3
10 to 29 percent	23	26.4
30 to 49 percent	11	12.6
50 percent or more	31	35.6
Electrical engineering	91	100.0
Less than 10 percent	46	50.5
10 to 29 percent	25	27.5
30 to 49 percent	12	13.2
50 percent or more	8	8.8
Geology	82	100.0
Less than 10 percent	35	42.7
10 to 29 percent	24	29.3
30 to 49 percent	11	13.4
50 percent or more	12	14.6
Mathematics	107	100.0
Less than 10 percent	70	65.4
10 to 29 percent	13	12.1
30 to 49 percent	5	4.7
50 percent or more	19	17.8

Field and pr research funds sources other research pr
Microbiology .
Less than 10
10 to 29 perc
30 to 49 perc
50 percent or
Physics ......
Less than 10
10 to 29 perc
30 to 49 perc
50 percent or
Physiology ...
Less than 10
10 to 29 perc
30 to 49 perc
50 percent or
Psychology ...
Less than 10
10 to 29 perc
30 to 49 perc
50 percent or
Sociology ...
Less than 10
10 to 29 perc
30 to 49 perc
50 percent or
Zoology .....
Less than 10
10 to 29 perc
30 to 49 perc
50 percent or

---

[1] Five of 1,366 departments did not provide data for this item, and they have been omitted from this analysis.

Source: National Science Foundation.

Table B-37. Proportion of research funds coming to doctorate-level science and engineering departments from sources other than Federal research project funds: 1974
(All institutions)

but 17 percent of the departments, Federal
ch project funds account for more than one-
all research funds available.

- The greatest proportion of departments reporting that one-half or more of their research funds come from sources other than Federal research project funds are economics, 35.6 percent; sociology, 32.2 percent; and botany, 31.6 percent.

Percent
100.0
39.2
31.0
12.7
17.0
100.0
39.3
39.3
9.8
11.6
100.0
40.0
42.7
6.7
10.7
100.0
36.8
15.8
15.8
31.6
100.0
9.8
46.3
25.6
18.3

Field and proportion of research funds coming from sources other than Federal research project funds	Number of departments	Percent
Chemistry	128	100.0
Less than 10 percent	24	18.8
10 to 29 percent	59	46.1
30 to 49 percent	26	20.3
50 percent or more	19	14.8
Economics	87	100.0
Less than 10 percent	22	25.3
10 to 29 percent	23	26.4
30 to 49 percent	11	12.6
50 percent or more	31	35.6
Electrical engineering	91	100.0
Less than 10 percent	46	50.5
10 to 29 percent	25	27.5
30 to 49 percent	12	13.2
50 percent or more	8	8.8
Geology	82	100.0
Less than 10 percent	35	42.7
10 to 29 percent	24	29.3
30 to 49 percent	11	13.4
50 percent or more	12	14.6
Mathematics	107	100.0
Less than 10 percent	70	65.4
10 to 29 percent	13	12.1
30 to 49 percent	5	4.7
50 percent or more	19	17.8
Microbiology	107	100.0
Less than 10 percent	46	43.0
10 to 29 percent	42	39.3
30 to 49 percent	9	8.4
50 percent or more	10	9.3
Physics	126	100.0
Less than 10 percent	69	54.8
10 to 29 percent	24	19.0
30 to 49 percent	13	10.3
50 percent or more	20	15.9
Physiology	84	100.0
Less than 10 percent	39	46.4
10 to 29 percent	22	26.2
30 to 49 percent	11	13.1
50 percent or more	12	14.3
Psychology	111	100.0
Less than 10 percent	41	36.9
10 to 29 percent	42	37.8
30 to 49 percent	10	9.0
50 percent or more	18	16.2
Sociology	90	100.0
Less than 10 percent	30	33.3
10 to 29 percent	13	14.4
30 to 49 percent	18	20.0
50 percent or more	29	32.2
Zoology	41	100.0
Less than 10 percent	16	39.0
10 to 29 percent	15	36.6
30 to 49 percent	4	9.8
50 percent or more	6	14 6

for this item,

Table B-38. Appropriateness of the split of research funds between young and senior faculty[1] in doctorate-level science and engineering departments: 1974

(All institutions)

- For all fields combined, 72.1 percent of the department heads state that the current split of research funds is appropriate for both young and senior faculty. For individual fields, the figures range from a low of 63.6 percent for mathematics to a high of 80.4 percent for biology.
- In general, young faculty are five times as likely as senior faculty to be considered disadvantaged in the split of research funds.
- Senior faculty in chemical engineering, economics, mathematics, and zoology are seen as being somewhat more disadvantaged than their colleagues in other fields.

Field	Number of departments	Percent of departments indicating—			Percent not responding
		Split appropriate	Split not appropriate; disadvantaged group is—		
			Young	Senior	
All fields	1,366	72.1	21.5	4.3	2.0
Biochemistry	112	80.4	15.2	3.6	.9
Biology	75	64.0	28.0	5.3	2.7
Botany	38	68.4	28.9	0.0	2.6
Chemical engineering	82	74.4	15.9	8.5	1.2
Chemistry	129	72.1	21.7	3.9	2.3
Economics	87	71.3	18.4	8.0	2.3
Electrical engineering	91	68.1	25.3	6.6	0.0
Geology	82	72.0	22.0	2.4	3.7
Mathematics	110	63.6	24.5	7.3	4.5
Microbiology	107	75.7	19.6	2.8	1.9
Physics	126	79.4	16.7	3.2	.8
Physiology	84	73.8	22.6	2.4	1.2
Psychology	111	70.3	27.9	.9	.9
Sociology	91	67.0	24.2	3.3	5.5
Zoology	41	78.0	14.6	7.3	0.0

[1] Senior faculty are those who have held doctorates for more than 7 years.

Source: National Science Foundation.

Table B-39. Appropriaten between young and senior and engineerin (Privat

- A somewhat greater proportion of yo disadvantaged in the split of research public institutions. The situation for vantaged proportion being less for p
- Barely more than one-half of the biol research funds as appropriate.

Field	Number of departments	P
		ap
All fields[2]	444	
Biochemistry	35	
Biology	35	
Chemical engineering	24	
Chemistry	45	
Economics	31	
Electrical engineering	28	
Geology	27	
Mathematics	40	
Microbiology	30	
Physics	45	
Physiology	31	
Psychology	40	
Sociology	29	

[1] Senior faculty are those who have held

[2] Includes botany and zoology departmen small number.

Source: National Science Foundation.

ess of the split of research funds faculty[1] in doctorate-level science ng departments: 1974 Institutions)

t of the department heads state that the current ate for both young and senior faculty. For in- n a low of 63.6 percent for mathematics to a high

mes as likely as senior faculty to be considered ch funds.

ring, economics, mathematics, and zoology are dvantaged than their colleagues in other fields.

Percent of departments indicating—			Percent not responding
Split ppropriate	Split not appropriate; disadvantaged group is—		
	Young	Senior	
72.1	21.5	4.3	2.0
80.4	15.2	3.6	.9
64.0	28.0	5.3	2.7
68.4	28.9	0.0	2.6
74.4	15.9	8.5	1.2
72.1	21.7	3.9	2.3
71.3	18.4	8.0	2.3
68.1	25.3	6.6	0.0
72.0	22.0	2.4	3.7
63.6	24.5	7.3	4.5
75.7	19.6	2.8	1.9
79.4	16.7	3.2	.8
73.8	22.6	2.4	1.2
70.3	27.9	.9	.9
67.0	24.2	3.3	5.5
78.0	14.6	7.3	0.0

ld doctorates for more than 7 years.

Table B-39. Appropriateness of the split of research funds between young and senior faculty[1] in doctorate-level science and engineering departments: 1974 (Private Institutions)

- A somewhat greater proportion of young faculty in private institutions is viewed as disadvantaged in the split of research funds than is the case for their counterparts in public institutions. The situation for senior faculty is just the reverse with the disadvantaged proportion being less for private institutions.
- Barely more than one-half of the biology department heads view the current split of research funds as appropriate.

Field	Number of departments	Percent of departments indicating—			Percent not responding
		Split appropriate	Split not appropriate; disadvantaged group is—		
			Young	Senior	
All fields[2]	444	70.7	22.7	3.6	2.9
Biochemistry	35	80.0	11.4	8.6	0.0
Biology	35	51.4	37.1	5.7	5.7
Chemical engineering	24	79.2	8.3	8.3	4.2
Chemistry	45	64.4	26.7	4.4	4.4
Economics	31	71.0	22.6	6.5	0.0
Electrical engineering	28	67.9	28.6	3.6	0.0
Geology	27	70.4	18.5	0.0	11.1
Mathematics	40	65.0	27.5	2.5	5.0
Microbiology	30	76.7	23.3	0.0	0.0
Physics	45	84.4	8.9	4.4	2.2
Physiology	31	83.9	16.1	0.0	0.0
Psychology	40	67.5	30.0	2.5	0.0
Sociology	29	58.6	34.5	0.0	6.9

---

[1] Senior faculty are those who have held doctorates for more than 7 years.

[2] Includes botany and zoology departments which are not separately reported because of the small number.

Source: National Science Foundation.

Table B-40. Appropriateness of the split of research funds between young and senior faculty[1] in doctorate-level science and engineering departments: 1974 (Public institutions)

- The proportion of department heads viewing the current split of research funds between young and senior faculty as appropriate is somewhat greater for public than private institutions, 72.8 percent compared with 70.7 percent.
- Mathematics departments, more than others, indicate that the current split of research funds is not appropriate. Senior faculty are the disadvantaged group in 10 percent of these departments.

Field	Number of departments	Percent of departments indicating—			Percent not responding
		Split appropriate	Split not appropriate; disadvantaged group is—		
			Young	Senior	
All fields	922	72.8	20.9	4.7	1.6
Biochemistry	77	80.5	16.9	1.3	1.3
Biology	40	75.0	20.0	5.0	0.0
Botany	36	66.7	30.6	0.0	2.8
Chemical engineering	58	72.4	19.0	8.6	0.0
Chemistry	84	76.2	19.0	3.6	1.2
Economics	56	71.4	16.1	8.9	3.6
Electrical engineering	63	68.3	23.8	7.9	0.0
Geology	55	72.7	23.6	3.6	0.0
Mathematics	70	62.9	22.9	10.0	4.3
Microbiology	77	75.3	18.2	3.9	2.6
Physics	81	76.5	21.0	2.5	0.0
Physiology	53	67.9	26.4	3.8	1.9
Psychology	71	71.8	26.8	0.0	1.4
Sociology	62	71.0	19.4	4.8	4.8
Zoology	39	79.5	12.8	7.7	0.0

[1] Senior faculty are those who have held doctorates for more than 7 years.

Source: National Science Foundation.

Table B-41. Appropriateness of between young and senior fac science and engineering depart rated as "distinguishe Roose-Anderse

- Almost three-fourths of these departments appropriate.
- Young faculty in botany and sociology dep more disadvantaged than their colleagues
- Among senior faculty, those most disadva

Field	Number of departments	Percent
		Split appropria
All fields[2]	313	74.8
Biochemistry	28	89.3
Botany	13	53.8
Chemical engineering	16	81.3
Chemistry	34	73.5
Economics	16	68.8
Electrical engineering	23	73.9
Geology	20	75.0
Mathematics	24	70.8
Microbiology	25	72.0
Physics	29	86.2
Physiology	22	72.7
Psychology	30	73.3
Sociology	20	60.0
Zoology	13	84.6

[1] Senior faculty are those who have held docto

[2] The Roose-Andersen study did not include biol study.

Source: National Science Foundation.

of the split of research funds faculty[1] in doctorate-level ng departments: 1974 stitutions)

ewing the current split of research funds ropriate is somewhat greater for public than red with 70.7 percent.

others, indicate that the current split of r faculty are the disadvantaged group in 10

nt of departments indicating—			Percent not responding
lit priate	Split not appropriate; disadvantaged group is—		
	Young	Senior	
.8	20.9	4.7	1.6
.5	16.9	1.3	1.3
.0	20.0	5.0	0.0
.7	30.6	0.0	2.8
.4	19.0	8.6	0.0
.2	19.0	3.6	1.2
.4	16.1	8.9	3.6
.3	23.8	7.9	0.0
.7	23.6	3.5	0.0
.9	22.9	10.0	4.3
.3	18.2	3.9	2.6
.5	21.0	2.5	0.0
.9	26.4	3.8	1.9
.8	26.8	0.0	1.4
.0	19.4	4.8	4.8
.5	12.8	7.7	0.0

ctorates for more than 7 years.

Table B-41. Appropriateness of the split of research funds between young and senior faculty[1] in doctorate-level science and engineering departments: 1974 (Departments rated as "distinguished" or "strong" in Roose-Andersen study)

- Almost three-fourths of these departments view the current split of funds as being appropriate.
- Young faculty in botany and sociology departments are seen as being considerably more disadvantaged than their colleagues in other fields.
- Among senior faculty, those most disadvantaged are in economics and zoology.

Field	Number of departments	Percent of departments indicating—			Percent not responding
		Split appropriate	Split not appropriate; disadvantaged group is—		
			Young	Senior	
All fields[2]	313	74.8	20.8	1.9	2.6
Biochemistry	28	89.3	10.7	0.0	0.0
Botany	13	53.8	38.5	0.0	7.7
Chemical engineering	16	81.3	18.8	0.0	0.0
Chemistry	34	73.5	23.5	0.0	2.9
Economics	16	68.8	18.8	12.5	0.0
Electrical engineering	23	73.9	26.1	0.0	0.0
Geology	20	75.0	20.0	0.0	5.0
Mathematics	24	70.8	25.0	0.0	4.2
Microbiology	25	72.0	20.0	4.0	4.0
Physics	29	86.2	6.9	3.4	3.4
Physiology	22	72.7	22.7	0.0	4.5
Psychology	30	73.3	26.7	0.0	0.0
Sociology	20	60.0	35.0	0.0	5.0
Zoology	13	84.6	0.0	15.4	0.0

[1] Senior faculty are those who have held doctorates for more than 7 years.

[2] The Roose-Andersen study did not include biology departments as designated in the present study.

Source: National Science Foundation.

Table B-42. Appropriateness of the split of research funds between young and senior faculty[1] in doctorate-level science and engineering departments: 1974 (20 largest departments in fall 1973 full-time graduate enrollment)

- Only a bare majority of departments of botany and electrical engineering see the current split of research funds as appropriate in contrast to departments of biochemistry, chemistry, physics, and zoology, where most find the current split appropriate.

Field	Number of departments	Percent of departments indicating—			Percent not responding
		Split appropriate	Split not appropriate; disadvantaged group is—		
			Young	Senior	
All fields	300	71.7	22.3	4.0	2.0
Biochemistry	20	85.0	5.0	10.0	0.0
Biology	20	70.0	25.0	5.0	0.0
Botany	20	55.0	40.0	0.0	5.0
Chemical engineering	20	70.0	25.0	5.0	0.0
Chemistry	20	85.0	10.0	0.0	5.0
Economics	20	60.0	30.0	10.0	0.0
Electrical engineering	20	55.0	35.0	10.0	0.0
Geology	20	75.0	25.0	0.0	0.0
Mathematics	20	65.0	25.0	5.0	5.0
Microbiology	20	70.0	25.0	5.0	0.0
Physics	20	85.0	10.0	0.0	5.0
Physiology	20	65.0	30.0	0.0	5.0
Psychology	20	75.0	25.0	0.0	0.0
Sociology	20	75.0	20.0	0.0	5.0
Zoology	20	85.0	5.0	10.0	0.0

[1] Senior faculty are those who have held doctorates for more than 7 years.

Source: National Science Foundation.

Table B-43. Appropriateness o young and senior faculty[1] in m engineering depa

- In general, there has been an increas the split of research funds to be appr Substantial decreases are noted in e

Field	Number of departments
All fields[2]	[3]577
Biochemistry	29
Biology	30
Chemical engineering	48
Chemistry	100
Economics	44
Electrical engineering	59
Mathematics	67
Microbiology	20
Physics	70
Physiology	18
Psychology	58
Sociology	34

[1] Senior faculty are those who have hel

[2] Botany, geology, and zoology were not this table.

[3] Of the 602 departments represented i supplied information on this topic.

Source: National Science Foundation.

ness of the split of research funds
r faculty[1] in doctorate-level science
nts: 1974 (20 largest departments in
ne graduate enrollment)

nts of botany and electrical engineering see the
as appropriate in contrast to departments of
nd zoology, where most find the current split ap-

Percent of departments indicating—			Percent not responding
Split appropriate	Split not appropriate; disadvantaged group is—		
	Young	Senior	
71.7	22.3	4.0	2.0
85.0	5.0	10.0	0.0
70.0	25.0	5.0	0.0
55.0	40.0	0.0	5.0
70.0	25.0	5.0	0.0
85.0	10.0	0.0	5.0
60.0	30.0	10.0	0.0
55.0	35.0	10.0	0.0
75.0	25.0	0.0	0.0
65.0	25.0	5.0	5.0
70.0	25.0	5.0	0.0
85.0	10.0	0.0	5.0
65.0	30.0	0.0	5.0
75.0	25.0	0.0	0.0
75.0	20.0	0.0	5.0
85.0	5.0	10.0	0.0

ld doctorates for more than 7 years.

Table B-43. Appropriateness of the split of research funds between young and senior faculty[1] in matched doctorate-level science and engineering departments: 1968 and 1974

- In general, there has been an increase in the proportion of departments considering the split of research funds to be appropriate. The greatest increase is for chemistry. Substantial decreases are noted in economics and psychology.

Field	Number of departments	Percent of departments indicating—			
		Split appropriate		Split not appropriate	
		1968	1974	1968	1974
All fields[2]	[3]577	68.3	73.0	31.7	27.0
Biochemistry	29	65.5	82.8	34.5	17.2
Biology	30	70.0	63.3	30.0	36.7
Chemical engineering	48	72.9	70.8	27.1	29.2
Chemistry	100	55.0	76.0	45.0	24.0
Economics	44	75.0	65.9	25.0	34.1
Electrical engineering	59	61.0	71.2	39.0	28.8
Mathematics	67	74.6	68.7	25.4	31.3
Microbiology	20	75.0	75.0	25.0	25.0
Physics	70	67.1	84.3	32.9	15.7
Physiology	18	72.2	66.7	27.8	33.3
Psychology	58	84.5	72.4	15.5	27.6
Sociology	34	61.8	67.6	38.2	32.4

[1] Senior faculty are those who have held doctorates for more than 7 years.

[2] Botany, geology, and zoology were not included in the 1968 survey and thus are omitted from this table.

[3] Of the 602 departments represented in both 1968 and 1974 surveys, 577 or 95.8 percent supplied information on this topic.

Source: National Science Foundation.

Table B-44. Proportion of all research funds going to young[1] faculty in doctorate-level science and engineering departments: 1974 (All institutions)

- More than one-half of the departments report that young faculty are receiving less than 25 percent of all research funds.

Field	Number of departments	Percent of departments by proportion of research funds going to young faculty					
		None[2]	1% to 24%	25% to 49%	50% to 74%	75% to 100%	No response
All fields	1,366	7.2	56.0	23.0	9.8	2.7	1.2
Biochemistry	112	8.0	62.5	20.5	3.6	.9	4.5
Biology	75	1.3	57.3	29.3	9.3	2.7	0.0
Botany	38	5.3	73.7	15.8	5.3	0.0	0.0
Chemical engineering	82	14.6	53.7	23.2	4.9	2.4	1.2
Chemistry	129	1.6	69.8	22.5	5.4	0.0	.8
Economics	87	4.6	39.1	36.8	16.1	3.4	0.0
Electrical engineering	91	8.8	58.2	14.3	14.3	4.4	0.0
Geology	82	6.1	63.4	17.1	8.5	2.4	2.4
Mathematics	110	9.1	36.4	34.5	10.9	7.3	1.8
Microbiology	107	16.8	56.1	12.1	11.2	2.8	.9
Physics	126	10.3	73.0	7.9	7.1	0.0	1.6
Physiology	84	8.3	59.5	27.4	3.6	1.2	0.0
Psychology	111	3.6	46.8	30.6	13.5	4.5	.9
Sociology	91	3.3	42.9	25.3	20.9	6.6	1.1
Zoology	41	2.4	43.9	36.6	14.6	0.0	2.4

[1] Young faculty are those who have held doctorates for 7 years or less.

[2] 68 departments, or 5.0 percent of the total, have no young faculty. Lack of young faculty accounts in large measure for the high percents reported under "None" for chemical engineering, microbiology, and physics.

Source: National Science Foundation.

Table B-45. Opinions of heads of doc
departments[1] concerning appropriate p
faculty:
(All insti

- In general, departments heads appear t
funds going to young faculty should refl
faculty.

Field	Number of departments	Me y
All fields	334	
Biochemistry	21	
Biology	23	
Botany	11	
Chemical engineering	19	
Chemistry	30	
Economics	21	
Electrical engineering	29	
Geology	19	
Mathematics	34	
Microbiology	20	
Physics	22	
Physiology	21	
Psychology	32	
Sociology	23	
Zoology	9	

[1] Opinions were solicited only from departm
research funds between young and senior facult

[2] Young faculty are those who have held doc

Source: National Science Foundation.

Table B-44. Proportion of all research funds going to young¹ faculty in doctorate-level science and engineering departments: 1974 (All institutions)

- More than one-half of the departments report that young faculty are receiving less than 25 percent of all research funds.

Field	Number of departments	Percent of departments by proportion of research funds going to young faculty					
		None²	1% to 24%	25% to 49%	50% to 74%	75% to 100%	No response
All fields	1,366	7.2	56.0	23.0	9.8	2.7	1.2
Biochemistry	112	8.0	62.5	20.5	3.6	.9	4.5
Biology	75	1.3	57.3	29.3	9.3	2.7	0.0
Botany	38	5.3	73.7	15.8	5.3	0.0	0.0
Chemical engineering	82	14.6	53.7	23.2	4.9	2.4	1.2
Chemistry	129	1.6	69.8	22.5	5.4	0.0	.8
Economics	87	4.6	39.1	36.8	16.1	3.4	0.0
Electrical engineering	91	8.8	58.2	14.3	14.3	4.4	0.0
Geology	82	6.1	63.4	17.1	8.5	2.4	2.4
Mathematics	110	9.1	36.4	34.5	10.9	7.3	1.8
Microbiology	107	16.8	56.1	12.1	11.2	2.8	.9
Physics	126	10.3	73.0	7.9	7.1	0.0	1.6
Physiology	84	8.3	59.5	27.4	3.6	1.2	0.0
Psychology	111	3.6	46.8	30.6	13.5	4.5	.9
Sociology	91	3.3	42.9	25.3	20.9	6.6	1.1
Zoology	41	2.4	43.9	36.6	14.6	0.0	2.4

[1] Young faculty are those who have held doctorates for 7 years or less.

[2] 68 departments, or 5.0 percent of the total, have no young faculty. Lack of young faculty accounts in large measure for the high percents reported under "None" for chemical engineering, microbiology, and physics.

Source: National Science Foundation.

Table B-45. Opinions of heads of doc departments¹ concerning appropriate p faculty: (All instit

- In general, departments heads appear t funds going to young faculty should refle faculty.

Field	Number of departments	Me yo
All fields	334	
Biochemistry	21	
Biology	23	
Botany	11	
Chemical engineering	19	
Chemistry	30	
Economics	21	
Electrical engineering	29	
Geology	19	
Mathematics	34	
Microbiology	20	
Physics	22	
Physiology	21	
Psychology	32	
Sociology	23	
Zoology	9	

[1] Opinions were solicited only from departm research funds between young and senior faculty

[2] Young faculty are those who have held doc

Source: National Science Foundation.

esearch funds going to young[1] nd engineering departments: 1974 itutions)

report that young faculty are receiving less

Percent of departments by proportion of research funds going to young faculty				
1% to 24%	25% to 49%	50% to 74%	75% to 100%	No response
56.0	23.0	9.8	2.7	1.2
62.5	20.5	3.6	.9	4.5
57.3	29.3	9.3	2.7	0.0
73.7	15.8	5.3	0.0	0.0
53.7	23.2	4.9	2.4	1.2
69.8	22.5	5.4	0.0	.8
39.1	36.8	16.1	3.4	0.0
58.2	14.3	14.3	4.4	0.0
63.4	17.1	8.5	2.4	2.4
36.4	34.5	10.9	7.3	1.8
56.1	12.1	11.2	2.8	.9
73.0	7.9	7.1	0.0	1.6
59.5	27.4	3.6	1.2	0.0
46.8	30.6	13.5	4.5	.9
42.9	25.3	20.9	6.6	1.1
43.9	36.6	14.6	0.0	2.4

ctorates for 7 years or less.
ave no young faculty. Lack of young faculty ac-
ported under "None" for chemical engineering,

Table B-45. Opinions of heads of doctorate-level science and engineering departments[1] concerning appropriate proportion of research funds for young[2] faculty: 1974

(All institutions)

- In general, departments heads appear to believe that the proportion of research funds going to young faculty should reflect the proportion of young faculty to total faculty.

Field	Number of departments	Median percent of young faculty in department	Median percent of research funds considered as appropriate for young faculty
All fields	334	30	30
Biochemistry	21	20	15
Biology	23	24	30
Botany	11	29	30
Chemical engineering	19	29	30
Chemistry	30	27	25
Economics	21	38	35
Electrical engineering	29	25	25
Geology	19	29	30
Mathematics	34	38	38
Microbiology	20	25	25
Physics	22	22	25
Physiology	21	40	40
Psychology	32	41	36
Sociology	23	44	40
Zoology	9	26	25

[1] Opinions were solicited only from department heads who stated that the current split of research funds between young and senior faculty is not appropriate.

[2] Young faculty are those who have held doctorates for 7 years or less.

Source: National Science Foundation.

Table B-46. Opinions of heads of doctorate-level science and engineering departments[1] concerning creation of special Federal research support programs specifically limited to young[2] or senior faculty: 1974
(All institutions)

- For all fields combined, a majority of department heads favor the creation of special Federal programs limited to young faculty. There is little support for similar programs limited to senior faculty.
- Seven out of 10 of those favoring creation of special Federal programs believe that some funds should be earmarked for special equipment.

Field	Number of departments	Percent favoring special programs for—			Percent opposed to special programs	Percent not responding
		Young faculty only	Senior faculty only	Percent of these favoring funds for special equipment		
All fields	356	52.2	3.4	70.7	42.4	2.0
Biochemistry	21	52.4	9.5	76.9	38.1	0.0
Biology	25	52.0	8.0	86.7	36.0	4.0
Botany	11	63.6	0.0	57.1	36.4	0.0
Chemical engineering	20	40.0	5.0	88.9	50.0	5.0
Chemistry	33	60.6	3.0	95.2	30.3	6.1
Economics	24	41.7	8.3	16.7	45.8	4.2
Electrical engineering	29	44.8	6.9	86.7	48.3	0.0
Geology	20	55.0	0.0	81.8	45.0	0.0
Mathematics	36	47.2	0.0	11.8	52.8	0.0
Microbiology	24	54.2	0.0	84.6	41.7	4.2
Physics	25	52.0	0.0	84.6	44.0	4.0
Physiology	21	42.9	0.0	88.9	57.1	0.0
Psychology	32	78.1	3.1	80.8	18.8	0.0
Sociology	26	53.8	3.8	40.0	42.3	0.0
Zoology	9	22.2	0.0	100.0	77.8	0.0

---

[1] Opinions were solicited only from department heads who stated that the current split of research funds between young and senior faculty is not appropriate.

[2] Young faculty are those who have held doctorates for 7 years or less.

Source: National Science Foundation.

Table B-47. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators[1] generally to secure support in research areas of their own choosing: 1974 (All institutions)

- Overall, slightly more than one-half of the department heads report that faculty investigators generally are able to secure support in research areas of their own choosing, with young investigators doing a little better than their senior colleagues.
- In mathematics the situation is particularly acute, with nearly two-thirds of the departments reporting that faculty investigators generally are not able to secure support in research areas of their own choosing.
- Across the board, department heads consider the inability of faculty investigators to secure support in research areas of their own choosing to be a major problem.

Field	Number of departments with—		Able to secure support in research areas of own choosing		NOT able to secure support in research area of own choosing				Percent of departments not responding	
							Percent considering this to be a major problem for—			
	Young[2]	Senior	Young	Senior	Young	Senior	Young	Senior	Young	Senior
All fields	1,292	1,357	55.5	54.8	42.6	43.9	88.4	83.2	1.9	1.3
Biochemistry	105	112	69.5	66.1	25.7	32.1	96.3	91.7	4.8	1.8
Biology	74	75	73.0	65.3	27.0	33.3	85.0	88.0	0.0	1.3
Botany	36	38	50.0	65.8	44.4	31.6	75.0	91.7	5.6	2.6
Chemical engineering	73	82	53.4	50.0	43.8	48.8	87.5	80.0	2.7	1.2
Chemistry	127	129	51.2	41.9	48.0	58.1	88.5	82.7	.8	0.0
Economics	84	85	57.1	61.2	41.7	36.5	82.9	74.2	1.2	2.4
Electrical engineering	87	88	55.2	54.5	43.7	45.5	79.0	80.0	1.2	0.0
Geology	76	82	48.7	58.5	50.0	39.0	84.2	78.1	1.3	2.4
Mathematics	107	110	36.4	37.3	62.6	60.9	85.1	76.1	.9	1.8
Microbiology	97	106	56.7	57.5	40.2	41.5	94.9	90.9	3.1	.9
Physics	116	126	60.3	42.9	37.9	57.1	86.4	81.9	1.7	0.0
Physiology	77	84	61.0	64.3	37.7	35.7	96.6	80.0	1.3	0.0
Psychology	105	109	51.4	59.6	46.7	39.4	98.0	86.1	1.9	.9
Sociology	89	90	51.7	57.8	44.9	38.9	90.0	91.4	3.4	3.3
Zoology	39	41	61.5	61.0	38.5	34.1	93.3	92.9	0.0	4.3

[1] Those spending 20 percent or more of their time in research. [2] Young investigators are those who have held doctorates for 7 years or less. Source: National Science Foundation.

Table B-48. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators[1] generally to secure support in research areas of their own choosing: 1974 (Private institutions)

- Departments in private institutions report slightly less difficulty than those in public institutions in the ability of faculty investigators to secure support in research areas of their own choosing.
- For private institutions, the groups having the greatest difficulties in securing support in research areas of their own choosing are young faculty investigators in chemical engineering and senior faculty investigators in chemistry.

Field	Number of departments with—		Able to secure support in research areas of own choosing		NOT able to secure support in research area of own choosing				Percent of departments not responding	
							Percent considering this to be a major problem for—			
	Young[2]	Senior	Young	Senior	Young	Senior	Young	Senior	Young	Senior

	with—		of own choosing				problem for—		responding	
	Young[2]	Senior	Young	Senior	Young	Senior	Young	Senior	Young	Senior
All fields	1,292	1,357	55.5	54.8	42.6	43.9	88.4	83.2	1.9	1.3
Biochemistry	105	112	69.5	66.1	25.7	32.1	96.3	91.7	4.8	1.8
Biology	74	75	73.0	65.3	27.0	33.3	85.0	88.0	0.0	1.3
Botany	36	38	50.0	65.8	44.4	31.6	75.0	91.7	5.6	2.6
Chemical engineering	73	82	53.4	50.0	43.8	48.8	87.5	80.0	2.7	1.2
Chemistry	127	129	51.2	41.9	48.0	58.1	88.5	82.7	.8	0.0
Economics	84	85	57.1	61.2	41.7	36.5	82.9	74.2	1.2	2.4
Electrical engineering	87	88	55.2	54.5	43.7	45.5	79.0	80.0	1.2	0.0
Geology	76	82	48.7	58.5	50.0	39.0	84.2	78.1	1.3	2.4
Mathematics	107	110	36.4	37.3	62.6	60.9	85.1	76.1	.9	1.8
Microbiology	97	106	56.7	57.5	40.2	41.5	94.9	90.9	3.1	.9
Physics	116	126	60.3	42.9	37.9	57.1	86.4	81.9	1.7	0.0
Physiology	77	84	61.0	64.3	37.7	35.7	96.6	80.0	1.3	0.0
Psychology	105	109	51.4	59.6	46.7	39.4	98.0	86.1	1.9	.9
Sociology	89	90	51.7	57.8	44.9	38.9	90.0	91.4	3.4	3.3
Zoology	39	41	61.5	61.0	38.5	34.1	93.3	92.9	0.0	4.9

---

[1] Those spending 20 percent or more of their time in research. [2] Young investigators are those who have held doctorates for 7 years or less. Source: National Science Foundation.

Table B-48. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators[1] generally to secure support in research areas of their own choosing: 1974 (Private institutions)

- Departments in private institutions report slightly less difficulty than those in public institutions in the ability of faculty investigators to secure support in research areas of their own choosing.
- For private institutions, the groups having the greatest difficulties in securing support in research areas of their own choosing are young faculty investigators in chemical engineering and senior faculty investigators in chemistry.

Field	Number of departments with—		Able to secure support in research areas of own choosing		NOT able to secure support in research area of own choosing				Percent of departments not responding	
							Percent considering this to be a major problem for—			
	Young[2]	Senior	Young	Senior	Young	Senior	Young	Senior	Young	Senior
All fields[3]	410	441	55.6	57.4	42.4	41.0	90.2	85.6	2.0	1.6
Biochemistry	33	35	66.7	77.1	27.3	20.0	100.0	85.7	6.1	2.9
Biology	34	35	70.6	65.7	29.4	31.4	90.0	100.0	0.0	2.9
Chemical engineering	21	24	33.3	50.0	61.9	45.8	92.3	81.8	4.8	4.2
Chemistry	43	45	46.5	31.1	53.5	68.9	82.6	83.9	0.0	0.0
Economics	30	30	40.0	53.3	56.7	43.3	94.1	92.3	3.3	3.3
Electrical engineering	26	27	53.8	51.9	46.2	48.2	75.0	84.6	0.0	0.0
Geology	25	27	48.0	55.6	52.0	40.7	84.6	72.7	0.0	3.7
Mathematics	38	40	55.3	62.5	44.7	37.5	94.1	80.0	0.0	0.0
Microbiology	26	29	61.5	62.1	34.6	37.9	100.0	100.0	3.8	0.0
Physics	40	45	67.5	48.9	30.0	51.1	83.3	82.6	2.5	0.0
Physiology	25	31	68.0	74.2	32.0	25.8	100.0	87.5	0.0	0.0
Psychology	38	40	50.0	60.0	47.4	37.5	94.4	80.0	2.6	2.5
Sociology	28	29	57.1	62.1	39.3	34.5	90.9	90.0	3.6	3.4

---

[1] Those spending 20 percent or more of their time in research. [2] Young faculty investigators are those who have held doctorate for 7 years or less. [3] Includes botany and zoology departments which are not separately reported because of the small number. Source: National Science Foundation.

Table B-49. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators[1] generally to secure support in research areas of their own choosing: 1974 (Public institutions)

- Senior faculty investigators in public institutions appear to be having somewhat more difficulty than their colleagues in private institutions in securing support in research areas of their own choosing.
- Nearly three-fourths of the mathematics departments in public institutions report that their faculty investigators, both young and senior, are not able to secure research support in areas of their own choosing.

Field	Number of departments with—		Able to secure support in research areas of own choosing		NOT able to secure support in research area of own choosing				Percent of departments not responding	
							Percent considering this to be a major problem for—			
	Young[2]	Senior	Young	Senior	Young	Senior	Young	Senior	Young	Senior
All fields	882	916	55.4	53.5	42.6	45.3	87.5	82.2	1.9	1.2
Biochemistry	72	77	70.8	61.0	25.0	37.7	94.4	93.1	4.2	1.3
Biology	40	40	75.0	65.0	25.0	35.0	80.0	78.6	0.0	0.0
Botany	35	36	48.6	63.9	45.7	33.3	75.0	91.7	5.7	2.8
Chemical engineering	52	58	61.5	50.0	36.5	50.0	84.2	79.3	1.9	0.0
Chemistry	84	84	53.6	47.6	45.2	52.4	92.1	81.8	1.2	0.0
Economics	54	55	66.7	65.5	33.3	32.7	72.2	61.1	0.0	1.8
Electrical engineering	61	61	55.7	55.7	42.6	44.3	80.8	77.8	1.6	0.0
Geology	51	55	49.0	60.0	49.0	38.2	84.0	81.0	2.0	1.8
Mathematics	69	70	26.1	22.9	72.5	74.3	82.0	75.0	1.4	2.9
Microbiology	71	77	54.9	55.8	42.3	42.9	93.3	87.9	2.8	1.3
Physics	76	81	56.6	39.5	42.1	60.5	87.5	81.6	1.3	0.0
Physiology	52	53	57.7	58.5	40.4	41.5	95.2	77.3	1.9	0.0
Psychology	67	69	52.2	59.4	46.3	40.6	100.0	89.3	1.5	0.0
Sociology	61	61	49.2	55.7	47.5	41.0	89.7	92.0	3.3	3.3
Zoology	37	39	64.9	64.1	35.1	30.8	92.3	91.7	0.0	5.1

---

[1] Those spending 20 percent or more of their time in research. [2] Young faculty investigators are those who have held doctorates for 7 years or less. Source: National Science Foundation.

Table B-50. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators[1] generally to secure support in research areas of their own choosing: 1974

(Departments rated as "distinguished" or "strong" in Roose-Anderson study)

- Overall, nearly two-thirds of the departments in this group report that their faculty investigators are generally able to secure support in research areas of their own choosing.
- Young faculty investigators in botany and senior faculty investigators in chemical engineering appear to be having substantial difficulties in securing support in research areas of their own choosing.

Field	Number of departments with—		Able to secure support in research areas of own choosing		NOT able to secure support in research area of own choosing				Percent of departments not responding	
							Percent considering this to be a major problem for—			
	Young[2]	Senior	Young	Senior	Young	Senior	Young	Senior	Young	Senior

	Young[2]	Senior	Young	Senior	Young	Senior	Young	Senior	Young	Senior
All fields	882	916	55.4	53.5	42.6	45.3	87.5	82.2	1.9	1.2
Biochemistry	72	77	70.8	61.0	25.0	37.7	94.4	93.1	4.2	1.3
Biology	40	40	75.0	65.0	25.0	35.0	80.0	78.6	0.0	0.0
Botany	35	36	48.6	63.9	45.7	33.3	75.0	91.7	5.7	2.8
Chemical engineering	52	58	61.5	50.0	36.5	50.0	84.2	79.3	1.9	0.0
Chemistry	84	84	53.6	47.6	45.2	52.4	92.1	81.8	1.2	0.0
Economics	54	55	66.7	65.5	33.3	32.7	72.2	61.1	0.0	1.8
Electrical engineering	61	61	55.7	55.7	42.6	44.3	80.8	77.8	1.6	0.0
Geology	51	55	49.0	60.0	49.0	38.2	84.0	81.0	2.0	1.8
Mathematics	69	70	26.1	22.9	72.5	74.3	82.0	75.0	1.4	2.9
Microbiology	71	77	54.9	55.8	42.3	42.9	93.3	87.9	2.8	1.3
Physics	76	81	56.6	39.5	42.1	60.5	87.5	81.6	1.3	0.0
Physiology	52	53	57.7	58.5	40.4	41.5	95.2	77.3	1.9	0.0
Psychology	67	69	52.2	59.4	46.3	40.6	100.0	89.3	1.5	0.0
Sociology	61	61	49.2	55.7	47.5	41.0	89.7	92.0	3.3	3.3
Zoology	37	39	64.9	64.1	35.1	30.8	92.3	91.7	0.0	5.1

[1] Those spending 20 percent or more of their time in research. [2] Young faculty investigators are those who have held doctorates for 7 years or less. Source: National Science Foundation.

Table B-50. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators[1] generally to secure support in research areas of their own choosing: 1974

(Departments rated as "distinguished" or "strong" in Roose-Anderson study)

- Overall, nearly two-thirds of the departments in this group report that their faculty investigators are generally able to secure support in research areas of their own choosing.
- Young faculty investigators in botany and senior faculty investigators in chemical engineering appear to be having substantial difficulties in securing support in research areas of their own choosing.

Field	Number of departments with—		Able to secure support in research areas of own choosing		NOT able to secure support in research area of own choosing				Percent of departments not responding	
							Percent considering this to be a major problem for—			
	Young[2]	Senior	Young	Senior	Young	Senior	Young	Senior	Young	Senior
All fields[3]	302	313	64.6	63.6	32.1	34.5	84.5	80.6	3.3	1.9
Biochemistry	26	28	69.2	75.0	15.4	17.9	100.0	100.0	15.4	7.1
Botany	12	13	33.3	61.5	50.0	30.8	66.7	100.0	16.7	7.7
Chemical engineering	16	16	62.5	37.5	37.5	62.5	83.3	80.0	0.0	0.0
Chemistry	34	34	52.9	55.9	47.1	44.1	93.8	86.7	0.0	0.0
Economics	16	16	68.8	62.5	25.0	31.3	100.0	100.0	6.3	6.3
Electrical engineering	23	23	60.9	52.2	39.1	47.8	77.8	90.9	0.0	0.0
Geology	18	20	55.6	55.0	44.4	40.0	87.5	62.5	0.0	0.0
Mathematics	24	24	70.8	66.7	29.2	33.3	57.1	75.0	0.0	0.0
Microbiology	24	25	62.5	80.0	29.2	20.0	85.7	60.0	8.3	0.0
Physics	28	29	82.1	62.1	17.9	37.9	60.0	54.5	0.0	0.0
Physiology	18	22	66.7	68.2	33.3	31.8	83.3	85.7	0.0	0.0
Psychology	30	30	63.3	70.0	36.7	30.0	90.9	66.7	0.0	0.0
Sociology	20	20	70.0	70.0	25.0	25.0	100.0	100.0	5.0	5.0
Zoology	13	13	76.9	61.5	23.1	38.5	100.0	100.0	0.0	0.0

[1] Those spending 20 percent or more of their time in research. [2] Young faculty investigators are those who have held doctorates for 7 years or less. [3] The Roose-Andersen study did not include biology departments as designated in the present study. Source: National Science Foundation.

Table B-51. Opinions of heads of doctorate-level science and engineering departments concerning ability of faculty investigators[1] generally to secure support in research areas of their own choosing: 1974 (20 largest departments in fall 1973 full-time graduate enrollment)

- Nearly two-thirds of these departments indicate that faculty investigators are generally able to secure support in research areas of their own choosing. There do appear to be problems for some groups, in particular, young faculty investigators in botany departments, and senior faculty investigators in chemical engineering and mathematics departments.

Field	Number of departments with—		Able to secure support in research areas of own choosing		NOT able to secure support in research area of own choosing				Percent of departments not responding	
							Percent considering this to be a major problem for—			
	Young[2]	Senior	Young	Senior	Young	Senior	Young	Senior	Young	Senior
All fields	293	300	64.5	62.0	33.8	36.3	85.9	78.9	1.7	1.7
Biochemistry	20	20	75.0	75.0	15.0	20.0	100.0	100.0	10.0	5.0
Biology	20	20	90.0	75.0	10.0	20.0	50.0	75.0	0.0	5.0
Botany	19	20	42.1	60.0	47.4	35.0	77.8	100.0	10.5	5.0
Chemical engineering	19	20	52.6	40.0	47.4	60.0	88.9	75.0	0.0	0.0
Chemistry	20	20	70.0	75.0	30.0	25.0	100.0	60.0	0.0	0.0
Economics	20	20	65.0	65.0	35.0	35.0	71.4	85.7	0.0	0.0
Electrical engineering	20	20	50.0	55.0	50.0	45.0	80.0	88.9	0.0	0.0
Geology	18	20	55.6	60.0	44.4	40.0	100.0	75.0	0.0	0.0
Mathematics	20	20	50.0	30.0	50.0	70.0	90.0	78.6	0.0	0.0
Microbiology	20	20	70.0	60.0	30.0	40.0	100.0	75.0	0.0	0.0
Physics	19	20	73.7	60.0	26.3	40.0	60.0	50.0	0.0	0.0
Physiology	19	20	57.9	65.0	42.1	35.0	87.5	85.7	0.0	0.0
Psychology	20	20	70.0	70.0	30.0	30.0	100.0	83.3	0.0	0.0
Sociology	20	20	70.0	75.0	25.0	20.0	80.0	75.0	5.0	5.0
Zoology	19	20	73.7	65.0	26.3	30.0	80.0	83.3	0.0	5.0

[1] Those spending 20 percent or more of their time in research.

[2] Young faculty investigators are those who have held doctorates for 7 years or less.

Source: National Science Foundation.

Table B-52. Proportion of faculty investigators[1] in doctorate-level science and engineering departments unable to secure support in research areas of own choosing. 1974
(All institutions)

- More than one-half of the young investigators and more than one-third of the senior investigators in the responding departments have been unable to secure support in research areas of their own choosing in the 12-month period ending in May 1974.

Field	Departments reporting young investigators generally not able to secure support in research areas of own choosing			Departments reporting senior investigators generally not able to secure support in research areas of own choosing		
	Number of departments	Total young investigators	Percent not able to secure support	Number of departments	Total senior investigators	Percent not able to secure support
All fields	550	3,354	51.3	596	7,157	37.8
Biochemistry	27	84	65.5	36	359	33.4
Biology	20	103	50.5	25	328	43.6
Botany	16	75	53.3	12	170	25.3
Chemical engineering	32	87	56.3	40	298	38.3
Chemistry	61	322	49.1	75	1,086	35.5
Economics	35	210	46.2	31	282	48.2
Electrical engineering	38	183	42.6	40	438	37.2
Geology	38	153	56.2	32	269	33.1
Mathematics	67	812	55.0	67	1,186	44.3
Microbiology	39	168	47.0	44	308	39.6
Physics	44	219	47.5	72	1,240	28.1
Physiology	29	120	60.8	30	227	30.8
Psychology	49	456	48.3	43	448	42.6
Sociology	40	257	49.8	35	325	49.2
Zoology	15	105	53.3	14	193	49.2

[1] Those spending 20 percent or more of their time in research.
Source: National Science Foundation

Table B-53. Proportion of faculty i
in research areas of own choosing
engineering departments where this
(All in

- More than nine out of 10 young faculty
faculty investigators who are unable to
choosing are in departments where th
- Mathematics departments account f
vestigators and almost one-fifth of all
secure support in research areas of th

Field	Number of departments reporting that young investigators are unable to secure support	Number of young investigators unable to secure support
All fields	550	1,722
Biochemistry	27	55
Biology	20	52
Botany	16	40
Chemical engineering	32	49
Chemistry	61	158
Economics	35	97
Electrical engineering	38	78
Geology	38	86
Mathematics	67	447
Microbiology	39	79
Physics	44	104
Physiology	29	73
Psychology	49	220
Sociology	40	128
Zoology	15	56

[1] Those spending 20 percent or more of th
Source: National Science Foundation.

nvestigators[1] in doctorate-level science le to secure support in research areas of oosing: 1974 nstitutions)

stigators and more than one-third of the senior rtments have been unable to secure support in g in the 12-month period ending in May 1974.

porting young enerally not support in own choosing	Departments reporting senior investigators generally not able to secure support in research areas of own choosing		
Percent not able to secure support	Number of departments	Total senior investigators	Percent not able to secure support
51.3	596	7,157	37.8
65.5	36	359	33.4
50.5	25	328	43.6
53.3	12	170	25.3
56.3	40	298	38.3
49.1	75	1,086	35.5
46.2	31	282	48.2
42.6	40	438	37.2
56.2	32	269	33.1
55.0	67	1,186	44.3
47.0	44	308	39.6
47.5	72	1,240	28.1
60.8	30	227	30.8
48.3	43	448	42.6
49.8	35	325	49.2
53.3	14	193	49.2

their time in research.

Table B-53. Proportion of faculty investigators[1] unable to secure support in research areas of own choosing who are in doctorate-level science and engineering departments where this is considered to be a major problem: 1974 (All institutions)

- More than nine out of 10 young faculty investigators and nearly nine out of 10 senior faculty investigators who are unable to secure support in research areas of their own choosing are in departments where this is considered to be a major problem.
- Mathematics departments account for more than one-fourth of all young investigators and almost one-fifth of all senior investigators who have been unable to secure support in research areas of their own choosing.

Field	Number of departments reporting that young investigators are unable to secure support	Number of young investigators unable to secure support	Percent of young investigators in departments considering this a major problem	Number of departments reporting that senior investigators are unable to secure support	Number of senior investigators unable to secure support	Percent of senior investigators in departments considering this a major problem
All fields	550	1,722	91.5	596	2,705	88.4
Biochemistry ...	27	55	98.2	36	120	95.8
Biology	20	52	90.4	25	143	93.0
Botany	16	40	85.0	12	43	100.0
Chemical engineering ...	32	49	89.8	40	114	90.4
Chemistry	61	158	89.2	75	385	90.9
Economics	35	97	86.6	31	136	79.4
Electrical engineering ...	38	78	91.0	40	163	88.3
Geology	38	86	94.2	32	89	87.6
Mathematics	67	447	85.5	67	525	77.9
Microbiology ...	39	79	94.9	44	122	90.2
Physics	44	104	93.3	72	349	88.0
Physiology	29	73	98.6	30	70	91.4
Psychology	49	220	99.1	43	191	93.7
Sociology	40	128	95.3	35	160	97.5
Zoology	15	56	94.6	14	95	97.9

[1] Those spending 20 percent or more of their time in research.

Source: National Science Foundation.

Table B-54. Number of faculty investigators[1] in doctorate-level science and engineering departments who participated in research projects at industrial or government laboratories: 1974 (All institutions)

- Doctorate faculty investigators in electrical engineering, chemical engineering, and chemistry departments account for over one-half of those participating in research projects in industrial laboratories.
- Physics departments have by far the largest number of participants in research projects in government laboratories, accounting for almost one-half of the total.
- Three departments—physics, electrical engineering, and chemistry—account for nearly 70 percent of the participants in research projects in government laboratories.
- Participation in research projects in government laboratories is substantially greater than that for industrial laboratories.

Field	All doctorate investigators	Industrial laboratory			Government laboratory		
		Total	Years since doctorate		Total	Years since doctorate	
			7 years or less	More than 7 years		7 years or less	More than 7 years
All fields	23,548	689	171	518	1,179	349	830
Biochemistry	1,456	4	1	3	11	1	10
Biology	1,616	14	4	10	26	8	18
Botany	516	3	0	3	6	2	4
Chemical engineering	739	112	34	78	53	18	35
Chemistry	2,634	108	19	89	114	30	84
Economics	1,407	15	5	10	30	16	14
Electrical engineering	1,394	176	47	129	140	52	88
Geology	944	35	8	27	53	13	40
Mathematics	3,290	26	7	19	52	18	34
Microbiology	1,086	38	2	36	33	5	28
Physics	3,013	79	10	69	563	145	418
Physiology	1,005	2	0	2	6	0	6
Psychology	2,318	64	29	35	44	18	26
Sociology	1,370	10	3	7	19	9	10
Zoology	760	3	2	1	29	14	15

[1] Those who are spending 20 percent or more of their time in research.

Source: National Science Foundation.

Table B-55. Proportion of faculty in
science and engineering departmen
projects at industrial or gover
(All institu

- Overall, only a small proportion of doctor
projects at industrial or government labor
- In general, the participation of senior doct
held the doctorate for more than seven yea
younger colleagues.
- Doctorate investigators in chemical and
ticipate to a much greater extent in researc
do faculty in other fields.
- Physics departments report by far the high
vestigators in research projects at governm
ticipation in projects at industrial laborato

Field	Percent of pa	
	Industrial labor	
	All doctorate investigators	Years doct
		7 years or less
All fields	2.9	2.4
Biochemistry	.3	.3
Biology	.9	.9
Botany	.6	.6
Chemical engineering	15.2	19.8
Chemistry	4.1	3.2
Economics	1.1	.9
Electrical engineering	12.6	10.9
Geology	3.7	3.1
Mathematics	.8	.5
Microbiology	3.5	.6
Physics	2.6	1.7
Physiology	.2	0.0
Psychology	2.8	3.1
Sociology	.7	.5
Zoology	.4	.9

[1] Those spending 20 percent or more of their

Source: National Science Foundation.

nvestigators[1] in doctorate-level ents who participated in research ernment laboratories: 1974 tutions)

cal engineering, chemical engineering, and one-half of those participating in research

est number of participants in research projnting for almost one-half of the total.

engineering, and chemistry—account for search projects in government laboratories.

rnment laboratories is substantially greater

ustrial laboratory		Government laboratory		
Years since doctorate			Years since doctorate	
7 years or less	More than 7 years	Total	7 years or less	More than 7 years
171	518	1,179	349	830
1	3	11	1	10
4	10	26	8	18
0	3	6	2	4
34	78	53	18	35
19	89	114	30	84
5	10	30	16	14
47	129	140	52	88
8	27	53	13	40
7	19	52	18	34
2	36	33	5	28
10	69	563	145	418
0	2	6	0	6
29	35	44	18	26
3	7	19	9	10
2	1	29	14	15

re of their time in research.

Table B-55. Proportion of faculty investigators[1] in doctorate-level science and engineering departments who participated in research projects at industrial or government laboratories: 1974
(All institutions)

- Overall, only a small proportion of doctorate investigators particpate in research projects at industrial or government laboratories.
- In general, the participation of senior doctorate investigators (i.e., those who have held the doctorate for more than seven years) is somewhat greater than that for their younger colleagues.
- Doctorate investigators in chemical and electrical engineering departments participate to a much greater extent in research projects at industrial laboratories than do faculty in other fields.
- Physics departments report by far the highest rate of participation by doctorate investigators in research projects at government laboratories, but below average participation in projects at industrial laboratories.

Field	Percent of participation in research projects in—					
	Industrial laboratory			Government laboratory		
	All doctorate investigators	Years since doctorate		All doctorate investigators	Years since doctorate	
		7 years or less	More than 7 years		7 years or less	More than 7 years
All fields	2.9	2.4	3.2	5.0	4.8	5.1
Biochemistry	.3	.3	.3	.8	.3	.9
Biology	.9	.9	.9	1.6	1.8	1.5
Botany	.6	.6	.8	1.2	1.5	1.0
Chemical engineering	15.2	19.8	13.8	7.2	10.5	6.2
Chemistry	4.1	3.2	4.4	4.3	5.0	4.1
Economics	1.1	.9	1.2	2.1	2.9	1.6
Electrical engineering	12.6	10.9	13.4	10.0	12.1	9.1
Geology	3.7	3.1	3.9	5.6	5.1	5.8
Mathematics	.8	.5	1.0	1.6	1.4	1.7
Microbiology	3.5	.6	4.7	3.0	1.6	3.6
Physics	2.6	1.7	2.9	18.7	24.5	17.3
Physiology	.2	0.0	.3	.6	0.0	.9
Psychology	2.8	3.1	2.5	1.9	1.9	1.9
Sociology	.7	.5	.9	1.4	1.5	1.3
Zoology	.4	.9	.2	3.8	6.0	2.9

[1] Those spending 20 percent or more of their time in research.

Source: National Science Foundation.

Table B-56. Change in time spent in classroom teaching by regular full-time faculty in doctorate-level science and engineering departments: 1970 to 1974 (All institutions)

- For all fields combined, about two-thirds of the departments report little change from 1970 to 1974 in time spent in classroom teaching by regular full-time faculty. For those departments reporting changes of 10 percent or more in classroom teaching time, more than four out of five have increases.
- Fields showing the greatest increases are biochemistry, biology, microbiology, physiology, and physics. Chemical engineering, electrical engineering, and zoology have the largest decreases.
- In general changes in Federal funding are seen as being primary causes of changes in classroom teaching time by one-fourth of the affected departments.

Field	Number of departments	Percent of departments in which classroom teaching time in 1974 compared to 1970 is—						Percent of departments with changes of 10 percent or more that attribute these primarily to changes in Federal funding	
		About the same[1]		Greater by 10 percent or more		Lesser by 10 percent or more			
		Young[2]	Senior	Young	Senior	Young	Senior	Young	Senior
All fields	1,366	63.2	65.0	25.3	28.6	5.8	4.8	25.9	28.7
Biochemistry	112	50.0	51.8	38.4	42.9	.9	1.8	13.6	16.0
Biology	75	57.3	60.0	36.0	37.3	4.0	1.3	10.0	10.3
Botany	38	63.2	63.2	23.7	26.3	5.3	7.9	0.0	15.4
Chemical engineering	82	62.2	72.0	14.6	19.5	11.0	7.3	42.9	45.5
Chemistry	129	71.3	71.3	20.2	24.0	6.2	4.7	26.5	18.9
Economics	87	69.0	67.8	25.3	25.3	5.7	4.6	33.3	34.6
Electrical engineering	91	56.0	60.4	24.2	28.6	16.5	9.9	51.4	54.3
Geology	82	67.1	70.7	22.0	22.0	6.1	4.9	21.7	18.2
Mathematics	110	78.2	77.3	18.2	20.0	1.8	1.8	31.8	41.7
Microbiology	107	49.5	50.5	34.6	43.0	4.7	5.6	14.3	21.2
Physics	126	57.9	57.1	28.6	38.1	4.8	4.0	33.3	32.1
Physiology	84	46.4	54.8	36.9	38.1	2.4	3.6	27.3	31.4
Psychology	111	77.5	75.7	19.8	21.6	1.8	1.8	37.5	46.2
Sociology	91	74.7	79.1	13.2	9.9	9.9	7.7	19.0	31.3
Zoology	41	63.4	61.0	22.0	24.4	12.2	14.6	7.1	18.8

[1] Change of less than 10 percent.

[2] Young faculty are those who have held doctorates for 7 years or less.

Source: National Science Foundation.

Table B-57. Comparison of all responding doctorate-level science and engineering departments and those in private institutions by number of departments and fall 1973 full-time graduate enrollment

- Departments in private institutions, although nearly one-third of all respondents, account for only slightly more than one-fourth of the full-time graduate enrollment.

Field	All departments		Departments in private institutions			
	Number of departments	Full-time graduate enrollment	Departments		Graduate enrollment	
			Number	Percent	Number	Percent
All fields	1,366	67,106	444	32.5	19,171	28.6
Biochemistry	112	2,543	35	31.1	689	27.1
Biology	75	4,178	35	46.7	1,615	38.7
Botany	38	1,184	2	5.3	80	6.8
Chemical engineering	82	2,601	24	29.3	800	30.8
Chemistry	129	9,065	45	34.9	2,488	27.4
Economics	87	5,182	31	35.6	1,814	35.0
Electrical engineering	91	5,918	28	30.8	2,236	37.8
Geology	82	3,273	27	32.9	907	27.7
Mathematics	110	6,230	40	36.4	1,511	24.3
Microbiology	107	2,233	30	28.0	384	17.2
Physics	126	7,138	45	35.7	2,536	35.5
Physiology	84	1,388	31	36.9	386	27.8
Psychology	111	8,929	40	36.0	2,262	25.3
Sociology	91	4,750	29	31.9	1,346	28.3
Zoology	41	2,494	2	4.9	117	4.7

Source: National Science Foundation.

Table B-58. Comparison of all respondin departments and those in public insti and fall 1973 full-time

- Departments in public institutions acc respondents and over seven-tenths of th

Field	All departments	
	Number of departments	Full-tin gradua enrollm
All fields	1,366	67,10
Biochemistry	112	2,54
Biology	75	4,17
Botany	38	1,18
Chemical engineering	82	2,60
Chemistry	129	9,06
Economics	87	5,18
Electrical engineering	91	5,91
Geology	82	3,27
Mathematics	110	6,23
Microbiology	107	2,23
Physics	126	7,13
Physiology	84	1,38
Psychology	111	8,92
Sociology	91	4,75
Zoology	41	2,49

Source: National Science Foundation.

sponding doctorate-level science nd those in private institutions 1973 full-time graduate enrollment

ugh nearly one-third of all respondents, ac- ourth of the full-time graduate enrollment.

	Departments in private institutions			
ime uate ment	Departments		Graduate enrollment	
	Number	Percent	Number	Percent
106	444	32.5	19,171	28.6
43	35	31.1	689	27.1
78	35	46.7	1,615	38.7
84	2	5.3	80	6.8
01	24	29.3	800	30.8
65	45	34.9	2,488	27.4
82	31	35.6	1,814	35.0
18	28	30.8	2,236	37.8
73	27	32.9	907	27.7
30	40	36.4	1,511	24.3
33	30	28.0	384	17.2
38	45	35.7	2,536	35.5
88	31	36.9	386	27.8
29	40	36.0	2,262	25.3
50	29	31.9	1,346	28.3
94	2	4.9	117	4.7

Table B-58. Comparison of all responding doctorate-level science and engineering departments and those in public institutions by number of departments and fall 1973 full-time graduate enrollment

- Departments in public institutions account for more than two-thirds of all respondents and over seven-tenths of the full-time graduate enrollment.

Field	All departments		Departments in public institutions			
	Number of departments	Full-time graduate enrollment	Departments		Graduate enrollment	
			Number	Percent	Number	Percent
All fields	1,366	67,106	922	67.5	47,935	71.4
Biochemistry	112	2,543	77	68.8	1,854	72.9
Biology	75	4,178	40	53.3	2,563	61.3
Botany	38	1,184	36	94.7	1,104	93.2
Chemical engineering	82	2,601	58	70.7	1,801	69.2
Chemistry	129	9,065	84	65.1	6,577	72.6
Economics	87	5,182	56	64.4	3,368	65.0
Electrical engineering	91	5,918	63	69.2	3,682	62.2
Geology	82	3,273	55	67.1	2,366	72.3
Mathematics	110	6,230	70	63.6	4,719	75.7
Microbiology	107	2,233	77	72.0	1,849	82.8
Physics	126	7,138	81	64.3	4,602	64.5
Physiology	84	1,388	53	63.1	1,002	72.2
Psychology	111	8,929	71	64.0	6,667	74.7
Sociology	91	4,750	62	68.1	3,404	71.7
Zoology	41	2,494	39	95.1	2,377	95.3

Source: National Science Foundation.

Table B-59. Comparison of all responding doctorate-level science and engineering departments and those rated as "distinguished" or "strong" in the Roose-Andersen study by number of departments and fall 1973 full-time graduate enrollment

- The Roose-Andersen-rated departments, although less than one-fourth of all respondents, enroll over four-tenths of the full-time graduate students.

Field	All departments		Departments rated as "distinguished" or "strong"			
			Departments		Graduate enrollment	
	Number	Full-time graduate enrollment	Number	Percent	Number	Percent
All fields[1]	1,291	62,928	313	24.2	26,806	42.6
Biochemistry	112	2,543	28	33.9	1,081	42.5
Botany	38	1,184	13	34.2	583	49.2
Chemical engineering	82	2,601	16	19.5	988	38.0
Chemistry	129	9,065	34	26.4	4,411	48.7
Economics	87	5,182	16	18.4	1,653	31.9
Electrical engineering	91	5,918	23	25.3	3,426	57.9
Geology	82	3,273	20	24.4	1,167	35.7
Mathematics	110	6,230	24	21.8	2,499	40.1
Microbiology	107	2,233	25	23.4	869	38.9
Physics	126	7,138	29	23.0	3,599	50.4
Physiology	84	1,388	22	26.2	513	37.0
Psychology	111	8,929	30	27.0	3,325	37.2
Sociology	91	4,750	20	22.0	1,653	34.8
Zoology	41	2,494	13	31.7	1,039	41.7

[1] The Roose-Andersen study did not include biology departments as designated in the present study.

Source: National Science Foundation.

Table B-60. Distribution of dep
or "strong" in Ro

- Five-sixths of the Roose-Andersen-ra
sponded to this survey.

Field
All selected fields[1]
Biochemistry
Botany[2]
Chemical engineering
Chemistry
Economics
Electrical engineering
Geology
Mathematics
Microbiology
Physics
Physiology
Psychology
Sociology
Zoology[3]

[1] The Roose-Andersen study did not inclu
ent study.

[2] Five institutions listed in the Roose-Ande
biology departments. If these five departmen
respondents would be 76.5 for botany.

[3] Fifteen institutions listed in the Roose-A
for biology departments. If these 15 departme
respondents would be 76.5 for zoology.

[4] If the base were adjusted downward by 2
zoology departments, the percent of respon
Source: National Science Foundation.

l responding doctorate-level science and and those rated as "distinguished" or ersen study by number of departments ll-time graduate enrollment

rtments, although less than one-fourth of all ths of the full-time graduate students.

rtments	Departments rated as "distinguished" or "strong"			
Full-time graduate enrollment	Departments		Graduate enrollment	
	Number	Percent	Number	Percent
62,928	313	24.2	26,806	42.6
2,543	28	33.9	1,081	42.5
1,184	13	34.2	583	49.2
2,601	16	19.5	988	38.0
9,065	34	26.4	4,411	48.7
5,182	16	18.4	1,653	31.9
5,918	23	25.3	3,426	57.9
3,273	20	24.4	1,167	35.7
6,230	24	21.8	2,499	40.1
2,233	25	23.4	869	38.9
7,138	29	23.0	3,599	50.4
1,388	22	26.2	513	37.0
8,929	30	27.0	3,325	37.2
4,750	20	22.0	1,653	34.8
2,494	13	31.7	1,039	41.7

clude biology departments as designated in the pres-

Table B-60. Distribution of departments rated as "distinguished" or "strong" in Roose-Andersen study

- Five-sixths of the Roose-Andersen-rated departments in the selected fields responded to this survey.

Field	Number of departments	Percent responding to survey
All selected fields[1]	377	[4]83.0
Biochemistry	32	87.5
Botany[2]	22	59.1
Chemical engineering	17	94.1
Chemistry	38	89.5
Economics	19	84.2
Electrical engineering	28	82.1
Geology	21	95.2
Mathematics	27	88.9
Microbiology	29	86.2
Physics	30	96.7
Physiology	29	75.9
Psychology	32	93.8
Sociology	21	95.2
Zoology[3]	32	40.6

[1] The Roose-Andersen study did not include biology departments as designated in the present study.

[2] Five institutions listed in the Roose-Andersen study under "botany" submitted reports for biology departments. If these five departments were excluded from the base, the percent of respondents would be 76.5 for botany.

[3] Fifteen institutions listed in the Roose-Andersen study under "zoology" submitted reports for biology departments. If these 15 departments were excluded from the base, the percent of respondents would be 76.5 for zoology.

[4] If the base were adjusted downward by 20 to take into account the changes for botany and zoology departments, the percent of respondents would be 87.7.

Source: National Science Foundation.

Table B-61. Comparison of all responding doctorate-level science and engineering departments and the 20 largest in full-time graduate enrollment by number of departments and fall 1973 full-time graduate enrollment

- These 300 departments, although less than one-fourth of the respondents, account for almost one-half of the full-time graduate enrollment.

Field	All departments		20 largest departments in graduate enrollment			
			Departments		Graduate enrollment	
	Number	Full-time graduate enrollment	Number	Percent	Number	Percent
All fields	1,366	67,106	300	22.0	31,494	46.9
Biochemistry	112	2,543	20	17.9	1,060	41.7
Biology	75	4,178	20	26.7	2,046	49.0
Botany	38	1,184	20	52.6	865	73.1
Chemical engineering	82	2,601	20	24.4	1,268	48.8
Chemistry	129	9,065	20	15.5	3,476	38.3
Economics	87	5,182	20	23.0	2,486	48.0
Electrical engineering	91	5,918	20	22.0	3,607	61.0
Geology	82	3,273	20	24.4	1,533	46.8
Mathematics	110	6,230	20	18.2	2,792	44.8
Microbiology	107	2,233	20	18.7	999	44.7
Physics	126	7,138	20	15.9	2,994	41.9
Physiology	84	1,388	20	23.8	815	58.7
Psychology	111	8,929	20	18.0	3,856	43.2
Sociology	91	4,750	20	22.0	2,028	42.7
Zoology	41	2,494	20	48.8	1,669	66.9

Source: National Science Foundation.

Table B-62. Comparison of all resp and engineering departments and 1 number of departments and fall 197

- The matched departments, accounting enroll nearly two-thirds of the graduat

Field	All departments	
	Number	Full-tim gradua enrollm
All fields[1]	1,205	60,15
Biochemistry	112	2,54
Biology	75	4,17
Chemical engineering	82	2,60
Chemistry	129	9,06
Economics	87	5,18
Electrical engineering	91	5,91
Mathematics	110	6,23
Microbiology	107	2,23
Physics	126	7,13
Physiology	84	1,38
Psychology	111	8,92
Sociology	91	4,75

[1] Botany, geology, and zoology were not inclu this table.

Source: National Science Foundation.

ponding doctorate-level science and
e 20 largest in full-time graduate
departments and fall 1973
uate enrollment

han one-fourth of the respondents, account
duate enrollment.

ts	20 largest departments in graduate enrollment			
-time duate llment	Departments		Graduate enrollment	
	Number	Percent	Number	Percent
106	300	22.0	31,494	46.9
543	20	17.9	1,060	41.7
178	20	26.7	2,046	49.0
184	20	52.6	865	73.1
601	20	24.4	1,268	48.8
065	20	15.5	3,476	38.3
182	20	[illegible]	2,486	48.0
918	20	[illegible]	3,607	61.0
273	20	24.4	1,533	46.8
230	20	18.2	2,792	44.8
233	20	18.7	999	44.7
138	20	15.9	2,994	41.9
388	20	23.8	815	58.7
929	20	18.0	3,856	43.2
750	20	22.0	2,028	42.7
494	20	48.8	1,069	66.9

Table B-62. Comparison of all responding doctorate-level science and engineering departments and 1968-74 matched departments by number of departments and fall 1973 full-time graduate enrollment

- The matched departments, accounting for just one-half of all respondents, enroll nearly two-thirds of the graduate students in these 12 fields.

Field	All departments		Matched departments, 1968-1974			
			Departments		Graduate enrollment	
	Number	Full-time graduate enrollment	Number	Percent	Number	Percent
All fields[1]	1,205	60,155	602	50.0	38,741	64.4
Biochemistry	112	2,543	31	27.7	1,084	42.6
Biology	75	4,178	32	42.7	1,841	44.1
Chemical engineering	82	2,601	52	63.4	1,919	73.8
Chemistry	129	9,065	103	79.8	7,817	86.2
Economics	87	5,182	45	51.7	3,197	61.7
Electrical engineering	91	5,918	61	67.0	4,561	77.1
Mathematics	110	6,230	69	62.7	4,675	75.0
Microbiology	107	2,233	22	20.6	699	31.3
Physics	126	7,138	77	61.1	4,848	67.9
Physiology	84	1,388	18	21.4	295	21.3
Psychology	111	8,929	58	52.3	5,612	62.9
Sociology	91	4,750	34	37.4	2,193	46.2

[1] Botany, geology, and zoology were not included in the 1968 survey and thus are omitted in this table.

Source: National Science Foundation.

Table B-63. Average number of faculty and full-time graduate students per doctorate-level science and engineering department: 1973-74 (All institutions)

- Mathematics departments have, on the average, the largest number of faculty while psychology departments have the largest average full-time graduate enrollment.

Field	Number of departments	Total number of faculty	Average number of faculty per department	Total Fall 1973 full-time graduate enrollment	Average full-time graduate enrollment per department	Graduate student : faculty ratio (unadjusted)
All fields	1,366	28,638	21.0	67,106	49.1	2.34 : 1
Biochemistry	112	1,516	13.5	2,543	22.7	1.68 : 1
Biology	75	1,969	26.3	4,178	55.7	2.12 : 1
Botany	38	636	16.7	1,184	31.2	1.86 : 1
Chemical engineering	82	891	10.9	2,601	31.7	2.92 : 1
Chemistry	129	3,056	23.7	9,065	70.3	2.97 : 1
Economics	87	2,020	23.2	5,182	59.6	2.57 : 1
Electrical engineering	91	2,082	22.9	5,918	65.0	2.84 : 1
Geology	82	1,145	14.0	3,273	39.9	2.86 : 1
Mathematics	110	4,064	36.9	6,230	56.6	1.53 : 1
Microbiology	107	1,209	11.3	2,233	20.9	1.85 : 1
Physics	126	3,356	26.6	7,138	56.7	2.13 : 1
Physiology	84	1,082	12.9	1,388	16.5	1.28 : 1
Psychology	111	2,917	26.3	8,929	80.4	3.06 : 1
Sociology	91	1,781	19.6	4,750	52.2	2.67 : 1
Zoology	41	914	22.3	2,494	60.8	2.73 : 1

Source: National Science Foundation.

Table B-64. Average number students per doctorate-level scienc (Private

- Electrical engineering departments h enrollment and the largest unadjusted

Field	Number of departments	Total number of faculty
All fields[1]	444	8,006
Biochemistry	35	485
Biology	35	759
Chemical engineering	24	250
Chemistry	45	878
Economics	31	603
Electrical engineering	28	601
Geology	27	324
Mathematics	40	1,076
Microbiology	30	286
Physics	45	1,110
Physiology	31	381
Psychology	40	776
Sociology	29	418

[1] Includes botany and zoology departments small number.

Source: National Science Foundation.

faculty and full-time graduate students
nd engineering department: 1973-74
institutions)

the average, the largest number of faculty while
largest average full-time graduate enrollment.

Average number of faculty per department	Total Fall 1973 full-time graduate enrollment	Average full-time graduate enrollment per department	Graduate student : faculty ratio (unadjusted)
21.0	67,106	49.1	2.34 : 1
13.5	2,543	22.7	1.68 : 1
26.3	4,178	55.7	2.12 : 1
16.7	1,184	31.2	1.86 : 1
10.9	2,601	31.7	2.92 : 1
23.7	9,065	70.3	2.97 : 1
23.2	5,182	59.6	2.57 : 1
22.9	5,918	65.0	2.84 : 1
14.0	3,273	39.9	2.86 : 1
36.9	6,230	56.6	1.53 : 1
11.3	2,233	20.9	1.85 : 1
26.6	7,138	56.7	2.13 : 1
12.9	1,388	16.5	1.28 : 1
26.3	8,929	80.4	3.06 : 1
19.6	4,750	52.2	2.67 : 1
22.3	2,494	60.8	2.73 : 1

Table B-64. Average number of faculty and full-time graduate students per doctorate-level science and engineering department: 1973-74 (Private institutions)

- Electrical engineering departments have the largest average full-time graduate enrollment and the largest unadjusted ratio of graduate students to faculty.

Field	Number of departments	Total number of faculty	Average number of faculty per department	Total Fall 1973 full-time graduate enrollment	Average full-time graduate enrollment per department	Graduate student : faculty ratio (unadjusted)
All fields[1]	444	8,006	18.0	19,171	43.2	2.40 : 1
Biochemistry	35	485	13.9	689	19.7	1.42 : 1
Biology	35	759	21.7	1,615	46.1	2.13 : 1
Chemical engineering	24	250	10.4	800	33.3	3.20 : 1
Chemistry	45	878	19.5	2,488	55.3	2.83 : 1
Economics	31	603	19.5	1,814	58.5	3.01 : 1
Electrical engineering	28	601	21.5	2,236	79.9	3.72 : 1
Geology	27	324	12.0	907	33.6	2.80 : 1
Mathematics	40	1,076	26.9	1,511	37.8	1.40 : 1
Microbiology	30	286	9.5	384	12.8	1.34 : 1
Physics	45	1,110	24.7	2,536	56.4	2.28 : 1
Physiology	31	381	12.3	386	12.5	1.01 : 1
Psychology	40	776	19.4	2.262	56.6	2.91 : 1
Sociology	29	418	14.4	1,346	46.4	3.22 : 1

---

[1] Includes botany and zoology departments which are not separately reported because of the small number.

Source: National Science Foundation.

Table B-65. Average number of faculty and full-time graduate students per doctorate-level science and engineering department: 1973-74 (Public institutions)

- Psychology departments have the largest average full-time graduate enrollment and the largest unadjusted ratio of graduate students to faculty.

Field	Number of departments	Total number of faculty	Average number of faculty per department	Total Fall 1973 full-time graduate enrollment	Average full-time graduate enrollment per department	Graduate student : faculty ratio (unadjusted)
All fields	922	20,632	22.4	47,935	52.0	2.32 : 1
Biochemistry	77	1,031	13.4	1,854	24.1	1.80 : 1
Biology	40	1,210	30.3	2,563	64.1	2.12 : 1
Botany	36	610	16.9	1,104	30.7	1.81 : 1
Chemical engineering	58	641	11.1	1,801	31.1	2.81 : 1
Chemistry	84	2,178	25.9	6,577	78.3	3.02 : 1
Economics	56	1,417	25.3	3,368	60.1	2.38 : 1
Electrical engineering	63	1,481	23.5	3,682	58.4	2.49 : 1
Geology	55	821	14.9	2,366	43.0	2.88 : 1
Mathematics	70	2,988	42.7	4,719	67.4	1.58 : 1
Microbiology	77	923	12.0	1,849	24.0	2.00 : 1
Physics	81	2,246	27.7	4,602	56.8	2.05 : 1
Physiology	53	701	13.2	1,002	18.9	1.43 : 1
Psychology	71	2,141	30.2	6,667	93.9	3.11 : 1
Sociology	62	1,363	22.0	3,404	54.9	2.50 : 1
Zoology	39	881	22.6	2,377	60.9	2.70 : 1

Source: National Science Foundation.

Table B-66. Average number of facult per doctorate-level science and en (Departments rated as "disti Roose-Anders

- Mathematics departments have the largest trical engineering departments have the la chemical engineering departments have t students to faculty.

Field	Number of departments	Total number of faculty	Aver numb faculty depa me
All fields[1]	313	8,621	27.
Biochemistry	28	469	16.
Botany	13	241	18.
Chemical engineering	16	226	14.
Chemistry	34	1,013	29.
Economics	16	446	27.
Electrical engineering	23	833	36.
Geology	20	372	18.
Mathematics	24	1,165	48.
Microbiology	25	359	14.
Physics	29	1,272	43.
Physiology	22	348	15.
Psychology	30	1,070	35.
Sociology	20	488	24.
Zoology	13	319	24.

[1] The Roose-Andersen study did not include b ent study.

Source: National Science Foundation.

ulty and full-time graduate students engineering department: 1973-74 stitutions)

st average full-time graduate enrollment and e students to faculty.

verage mber of ulty per lepart- ment	Total Fall 1973 full-time graduate enroll- ment	Average full-time graduate enrollment per depart- ment	Graduate student : faculty ratio (unadjusted)
22.4	47,935	52.0	2.32 : 1
13.4	1,854	24.1	1.80 : 1
30.3	2,563	64.1	2.12 : 1
16.9	1,104	30.7	1.81 : 1
11.1	1,801	31.1	2.81 : 1
25.9	6,577	78.3	3.02 : 1
25.3	3,368	60.1	2.38 : 1
23.5	3,682	58.4	2.49 : 1
14.9	2,366	43.0	2.88 : 1
42.7	4,719	67.4	1.58 : 1
12.0	1,849	24.0	2.00 : 1
27.7	4,602	56.8	2.05 : 1
13.2	1,002	18.9	1.43 : 1
30.2	6,667	93.9	3.11 : 1
22.0	3,404	54.9	2.50 : 1
22.6	2,377	60.9	2.70 : 1

Table B-66. Average number of faculty and full-time graduate students per doctorate-level science and engineering department: 1973-74 (Departments rated as "distinguished" or "strong" in Roose-Andersen study)

- Mathematics departments have the largest average number of full-time faculty, electrical engineering departments have the largest full-time graduate enrollment, and chemical engineering departments have the largest unadjusted ratio of graduate students to faculty.

Field	Number of depart- ments	Total number of faculty	Average number of faculty per depart- ment	Total Fall 1973 full-time graduate enroll- ment	Average full-time graduate enrollment per depart- ment	Graduate student : faculty ratio (unadjusted)
All fields[1]	313	8,621	27.5	26,806	85.6	3.11 : 1
Biochemistry	28	469	16.8	1,081	38.6	2.30 : 1
Botany	13	241	18.5	583	44.8	2.42 : 1
Chemical engineering	16	226	14.1	988	61.8	4.37 : 1
Chemistry	34	1,013	29.8	4,411	129.7	4.35 : 1
Economics	16	446	27.9	1,653	103.3	3.71 : 1
Electrical engineering	23	833	36.2	3,426	149.0	4.11 : 1
Geology	20	372	18.6	1,167	58.4	3.14 : 1
Mathematics	24	1,165	48.5	2,499	104.1	2.15 : 1
Microbiology	25	359	14.4	869	34.8	2.42 : 1
Physics	29	1,272	43.9	3,599	124.1	2.83 : 1
Physiology	22	348	15.8	513	23.3	1.47 : 1
Psychology	30	1,070	35.7	3,325	110.8	3.11 : 1
Sociology	20	488	24.4	1,653	82.7	3.39 : 1
Zoology	13	319	24.5	1,039	79.9	3.26 : 1

[1] The Roose-Andersen study did not include biology departments as designated in the present study.

Source: National Science Foundation.

Table B-67. Average number of faculty and full-time graduate students per doctorate-level science and engineering department: 1973-74 (20 largest departments in fall 1973 full-time graduate enrollment)

- Mathematics departments have the largest average number of full-time faculty but the lowest unadjusted ratio of graduate students to faculty.

Field	Number of departments	Total number of faculty	Average number of faculty per department	Total Fall 1973 full-time graduate enrollment	Average full-time graduate enrollment per department	Graduate student : faculty ratio (unadjusted)
All fields	300	9,379	31.3	31,494	105.0	3.36 : 1
Biochemistry	20	370	18.5	1,060	53.0	2.86 : 1
Biology	20	773	38.7	2,046	102.3	2.65 : 1
Botany	20	382	19.1	865	43.3	2.26 : 1
Chemical engineering	20	294	14.7	1,268	63.4	4.31 : 1
Chemistry	20	710	35.5	3,476	173.8	4.90 : 1
Economics	20	631	31.6	2,486	124.3	3.94 : 1
Electrical engineering	20	817	40.9	3,607	180.4	4.41 : 1
Geology	20	377	18.9	1,533	76.7	4.07 : 1
Mathematics	20	1,270	63.5	2,792	139.6	2.20 : 1
Microbiology	20	356	17.8	999	50.0	2.81 : 1
Physics	20	981	49.1	2,994	149.7	3.05 : 1
Physiology	20	340	17.0	815	40.8	2.40 : 1
Psychology	20	975	48.8	3,856	192.8	3.95 : 1
Sociology	20	569	28.5	2,028	101.4	3.56 : 1
Zoology	20	534	26.7	1,669	83.5	3.13 : 1

Source: National Science Foundation.

Table B-68. Average number of fa per doctorate-level science and (Departments responding t

- The matched departments have, on the ty and graduate students than do all o

Field	Number of departments	Total number of faculty
All fields[1]	602	15,296
Biochemistry	31	535
Biology	32	798
Chemical engineering	52	576
Chemistry	103	2,555
Economics	45	1,131
Electrical engineering	61	1,523
Mathematics	69	2,849
Microbiology	22	290
Physics	77	2,190
Physiology	18	279
Psychology	58	1,798
Sociology	34	772

[1] Botany, geology and zoology were not inc this table.

Source: National Science Foundation.

f faculty and full-time graduate students and engineering department: 1973-74 ll 1973 full-time graduate enrollment)

e largest average number of full-time faculty but duate students to faculty.

Average number of faculty per depart-ment	Total Fall 1973 full-time graduate enroll-ment	Average full-time graduate enrollment per depart-ment	Graduate student : faculty ratio (unadjusted)
31.3	31,494	105.0	3.36 : 1
18.5	1,060	53.0	2.86 : 1
38.7	2,046	102.3	2.65 : 1
19.1	865	43.3	2.26 : 1
14.7	1,268	63.4	4.31 : 1
35.5	3,476	173.8	4.90 : 1
31.6	2,486	124.3	3.94 : 1
40.9	3,607	180.4	4.41 : 1
18.9	1,533	76.7	4.07 : 1
63.5	2,792	139.6	2.20 : 1
17.8	999	50.0	2.81 : 1
49.1	2,994	149.7	3.05 : 1
17.0	815	40.8	2.40 : 1
48.8	3,856	192.8	3.95 : 1
28.5	2,028	101.4	3.56 : 1
26.7	1,669	83.5	3.13 : 1

Table B-68. Average number of faculty and full-time graduate students per doctorate-level science and engineering department: 1973-74 (Departments responding to both 1968 and 1974 surveys)

- The matched departments have, on the average, somewhat greater numbers of faculty and graduate students than do all other departments included in the 1974 survey.

Field	Number of depart-ments	Total number of faculty	Average number of faculty per depart-ment	Total Fall 1973 full-time graduate enroll-ment	Average full-time graduate enrollment per depart-ment	Graduate student : faculty ratio (unadjusted)
All fields[1]	602	15,296	25.4	38,741	64.4	2.53 : 1
Biochemistry	31	535	17.3	1,084	35.0	2.03 : 1
Biology	32	798	24.9	1,841	57.5	2.31 : 1
Chemical engineering	52	576	11.1	1,919	36.9	3.33 : 1
Chemistry	103	2,555	24.8	7,817	75.9	3.06 : 1
Economics	45	1,131	25.1	3,197	71.0	2.83 : 1
Electrical engineering	61	1,523	25.0	4,561	74.8	2.99 : 1
Mathematics	69	2,849	41.3	4,675	67.8	1.64 : 1
Microbiology	22	290	13.2	699	31.8	2.41 : 1
Physics	77	2,190	28.4	4,848	63.0	2.21 : 1
Physiology	18	279	15.5	295	16.4	1.06 : 1
Psychology	58	1,798	31.0	5,612	96.8	3.12 : 1
Sociology	34	772	22.7	2,193	64.5	2.84 : 1

[1] Botany, geology and zoology were not included in the 1968 survey and thus are omitted in this table.

Source: National Science Foundation.

APPENDIX C

Survey Instruments

NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C. 20550

Dear Colleague:

The National Science Foundation periodically has conducted surveys to gain information about research activities of faculty in college and university science and engineering departments. The status of younger faculty members in research activities is of special and continuing interest. Quantitative information on academic research activities was last collected in 1968. Since that time, major changes in Federal and non-Federal funding of academic science have taken place. Thus, it seems important to obtain up-to-date data and to determine changes that have occurred since 1968 so that this information can be provided to those involved in the formulation of academic science policy.

We ask that you request heads of departments granting doctorates in the following disciplines to complete a questionnaire: biochemistry, biology, botany, chemical engineering, chemistry, economics, electrical engineering, geology, mathematics, microbiology, physics, physiology, psychology, sociology, and zoology. Please see General Instructions for more detail concerning selected science departments which are to be covered. The Cover Sheet is for your use in returning the completed questionnaire forms. Copies of these materials have been mailed separately to medical school representatives in order to provide coverage of eligible departments.

The information gathered in this survey will be used only for developing statistical information for use in connection with policy development and program planning. Individual institutions or departments will not be identified with the data they report.

We urgently request the cooperation of all institutions in completing the questionnaire and returning it by June 3, 1974, to the Division of Science Resources Studies, National Science Foundation, 1800 G Street, N.W., Washington, D.C. 20550. If you cannot meet the above date, please let us know. If you have any questions concerning the information requested or if you need additional copies of the questionnaire, please write to me or call the Science Education Studies Group of this Division: Area Code 202, 282-7730.

We appreciate your helpful
completed and returned to
We will provide copies of

Enclosures

NCE FOUNDATION
ON, D.C. 20550

periodically has conducted surveys
rch activities of faculty in college
neering departments. The status of
arch activities is of special and
ive information on academic research
n 1968. Since that time, major
ral funding of academic science have
portant to obtain up-to-date data
ave occurred since 1968 so that this
those involved in the formulation of

f departments granting doctorates in
mplete a questionnaire: biochemistry,
eering, chemistry, economics,
, mathematics, microbiology, physics,
gy, and zoology. Please see General
ncerning selected science departments
over Sheet is for your use in
nnaire forms. Copies of these
rately to medical school representa-
age of eligible departments.

s survey will be used only for
ion for use in connection with policy
g. Individual institutions or
ied with the data they report.

tion of all institutions in completing
it by June 3, 1974, to the Division
tional Science Foundation, 1800 G
20550. If you cannot meet the above
ou have any questions concerning the
need additional copies of the
e or call the Science Education
Area Code 202, 282-7730.

We appreciate your helpfulness in having the questionnaire completed and returned to the National Science Foundation. We will provide copies of the final report to all respondents.

Sincerely yours,

Charles E. Falk

Charles E. Falk
Director, Division of Science
Resources Studies

Enclosures

O.M.B. Number 099S 74005
Approval Expires June 1975
Date of Approval: 3/26/74

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

SURVEY OF FACULTY RESEARCH ACTIVITIES, SPRING 1974

GENERAL INSTRUCTIONS

The National Science Foundation is conducting this survey to develop a better understanding of faculty research activities and to provide current information for academic science policy formulation. Questionnaires for obtaining the information are being sent to a sample of institutions granting doctorates in the sciences.

Information gathered in this survey will be used only for developing statistical information for policy development and program planning. **Individual institutions or departments will not be identified with the data they report.**

Please obtain completed questionnaires for the requested departments, package them together, and return to the National Science Foundation by June 3, 1974. Please provide all available questionnaires June 3 and submit other questionnaires as soon as possible thereafter. In order to assist us in maintaining a control on all questionnaires submitted or expected, please indicate on the Cover Sheet enclosed (1) the selected science departments for which questionnaires are submitted and (2) those designated science departments for which questionnaires are **not** included in the initial submission. A postage-free, self-addressed return envelope is enclosed.

Except for the Cover Sheet, there is no institution-wide item. The individual questionnaires are to be completed by heads of departments granting doctorates in the following selected science disciplines:

Biochemistry. Include departments of biochemistry or biological chemistry.

Biology. Include only departments designated as biology or biological science. Do not include departments covering only specialized fields such as cellular biology or molecular biology.

Botany. Include departments of botany or botany and other subjects, e.g., botany and plant pathology.

Chemical engineering

Chemistry

Economics. Do not include departments of agricultural economics.

Electrical engineering

Geology. Include only departments designated as geology or geological science.

Mathematics. Do not include departments limited to applied mathematics, computer science, or statistics.

Microbiology. Include only departments designated as microbiology or bacteriology.

Physics. Include only departments designated as physics or physics and astronomy. Do not include highly specialized departments such as molecular physics or electrophysics.

Physiology. Include departments of physiology or physiology and other subjects, e.g., physiology and biophysics.

Psychology. Do not include highly specialized departments or fields of education such as departments of child development, child studies, educational psychology, or counseling.

Sociology. Include departments designated as sociology or sociology and anthropology.

Zoology. Include departments of zoology or zoology and other subjects, e.g., zoology and entomology.

NATIONAL SCIENCE
Washington, D.C

SURVEY OF FACULTY RESEARCH

COVER SH

Reports are requested only for de
degree. Please cross out departments
institution, and make appropriate nota
to be submitted. Indicate departments l
using an asterisk (*).

h

Biochemistry ....
Biology ....
Botany ....
Chemical engineering ....
Chemistry ....
Economics ....
Electrical engineering ....
Geology ....
Mathematics ....
Microbiology ....
Physics ....
Physiology ....
Psychology ....
Sociology ....
Zoology ....

Name of institution

Person to be called regarding departmenta
forms to be submitted at a later date

O.M.B. Number 099S 74005
Approval Expires June 1975
Date of Approval: 3/26/74

NCE FOUNDATION
n, D.C. 20550

RCH ACTIVITIES, SPRING 1974

STRUCTIONS

Botany. Include departments of botany or botany and other subjects, e.g., botany and plant pathology.

Chemical engineering

Chemistry

Economics. Do not include departments of agricultural economics.

Electrical engineering

Geology. Include only departments designated as geology or geological science.

Mathematics. Do not include departments limited to applied mathematics, computer science, or statistics.

Microbiology. Include only departments designated as microbiology or bacteriology.

Physics. Include only departments designated as physics or physics and astronomy. Do not include highly specialized departments such as molecular physics or electrophysics.

Physiology. Include departments of physiology or physiology and other subjects, e.g., physiology and biophysics.

Psychology. Do not include highly specialized departments or fields of education such as departments of child development, child studies, educational psychology, or counseling.

Sociology. Include departments designated as sociology or sociology and anthropology.

Zoology. Include departments of zoology or zoology and other subjects, e.g., zoology and entomology.

O.M.B. Number 099S 74005
Approval Expires June 1975
Date of Approval: 3/26/74

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

SURVEY OF FACULTY RESEARCH, ACTIVITIES, SPRING 1974

COVER SHEET

Reports are requested only for departments granting the doctor's degree. Please cross out departments not granting doctorates in your institution, and make appropriate notations for reports submitted or to be submitted. Indicate departments located in the medical school by using an asterisk (*).

	Submitted herewith (check)	To be submitted by (indicate date)
Biochemistry		
Biology		
Botany		
Chemical engineering		
Chemistry		
Economics		
Electrical engineering		
Geology		
Mathematics		
Microbiology		
Physics		
Physiology		
Psychology		
Sociology		
Zoology		

Name of institution

Person to be called regarding departmental forms to be submitted at a later date

Phone number

O.M.B. Number 099S 74005
Approval Expires June 1975
Date of Approval: 3/26/74

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

SURVEY OF FACULTY RESEARCH ACTIVITIES, SPRING 1974

Information for Department Head

The National Science Foundation periodically has conducted surveys to gain information about research activities of faculty in college and university science and engineering departments. The status of younger faculty members in research activities is of special and continuing interest. Quantitative information on academic research activities was last collected in 1968. Since that time, major changes in Federal and non-Federal funding of academic science have taken place. Thus, it seems important to obtain up-to-date data and to determine changes that have occurred since 1968 so that this information can be provided to those involved in the formulation of academic science policy.

The enclosed questionnaire is being sent to you and to heads of other selected departments in a sample of institutions granting doctorates in the sciences. Since the number of departments queried is not large, it is quite important that your answers be included along with others in your field. Your helpfulness in assisting us in this endeavor by completing the questionnaire promptly will be appreciated. In the summarization of this study, the information obtained from individual departments or institutions will not be identified in published material.

If there are any questions concerning the information requested, please write or call the **Science Education Studies Group, Division of Science Resources Studies, National Science Foundation, 1800 G Street, N.W., Washington, D.C. 20550, Area Code 202, 282-7730.**

Please indicate on your copy of the questionnaire the name of your department and institution. Replies should be sent to your institution's coordinator for this survey for forwarding to the National Science Foundation. We will provide copies of the final report to all respondents.

Instructions

The questions herein relate to research activities of regular full-time faculty assigned to your department. Include only persons who serve at a professional level in your department as faculty at all ranks, including instructor and assistant professor. Please **do not** include the following as a regular full-time faculty: visiting professors, postdoctorates and research associates, graduate students, or others who are not regular full-time faculty of your department. Include yourself.

In providing information about reg
least half time in your department and p
consider the following: Copies of this q
heads of doctorate-level departments
biology, botany, chemical engineerin
engineering, geology, mathematics,
psychology, sociology, and zoology. If a
time in your department also serve par
above, please confer with the head of th
provide the information. The reporting d
as if the individual were assigned solel

You should not include in this repo
less than half time in your department
institution should also be excluded fro

Data are requested separately on f
time since the doctorate was earned. Fa
doctorate after July 1, 1967, should be c
since doctorate. For purposes of this st
"young" faculty.

In some departments, particularly th
a substantial number of regular full-tim
than the Ph.D. or D.Sc. This survey i
comparison with a similar survey carried
faculty research activity. Thus, there is
numbers of Ph.D.'s and D.Sc.'s but al
Consequently, we ask that for questions
for each item concerning doctorate facu
than the Ph.D., or D.Sc., e.g., M.D., D.D

The assumption made in question
research is for the purpose of this study
amount of research funds are intended.

If additional space is needed for expl
an additional sheet of paper.

Definitions

Fiscal year (abbreviation FY) means
and ending the following June 30, e.g.,
June 30, 1974.

The term **tenured** should be interpr
who have completed a probationary peri
continuous appointments.

Please Note

To avoid the impression that a respo
please use **none, not applicable (or N.A.**
assist in the interpretation of replies.

Please use the reverse of the qu
question numbers) to extend remarks.

O.M.B. Number 099S 74005
Approval Expires June 1975
Date of Approval: 3/26/74

ICE FOUNDATION
n, D.C. 20550

RCH ACTIVITIES, SPRING 1974

Department Head

periodically has conducted surveys to
ities of faculty in college and university
The status of younger faculty members
and continuing interest. Quantitative
ivities was last collected in 1968. Since
and non-Federal funding of academic
ms important to obtain up-to-date data
ve occurred since 1968 so that this
involved in the formulation of academic

ing sent to you and to heads of other
institutions granting doctorates in the
tments queried is not large, it is quite
ed along with others in your field. Your
eavor by completing the questionnaire
ne summarization of this study, the
departments or institutions will not be

ning the information requested, please
Studies Group, Division of Science
e Foundation, 1800 G Street, N.W.,
02, 282-7730.

the questionnaire the name of your
should be sent to your institution's
ing to the National Science Foundation.
oort to all respondents.

esearch activities of regular full-time
Include only persons who serve at a
nt as faculty at all ranks, including
ease **do not** include the following as a
fessors, postdoctorates and research
s who are not regular full-time faculty of

In providing information about regular full-time faculty who may serve at least half time in your department and part time in another department, please consider the following: Copies of this questionnaire have been distributed to heads of doctorate-level departments in the following fields: biochemistry, biology, botany, chemical engineering, chemistry, economics, electrical engineering, geology, mathematics, microbiology, physics, physiology, psychology, sociology, and zoology. If any full-time faculty serving at least half time in your department also serve part time in one of the departments listed above, please confer with the head of the other department to decide who will provide the information. The reporting department should provide information as if the individual were assigned solely to that department.

You should not include in this report any regular full-time faculty serving less than half time in your department. Faculty employed part time at your institution should also be excluded from this report.

Data are requested separately on full-time faculty according to length of time since the doctorate was earned. Faculty members who were awarded the doctorate after July 1, 1967, should be counted in the category "7 years or less" since doctorate. For purposes of this study, these individuals are considered "young" faculty.

In some departments, particularly those associated with medical schools, a substantial number of regular full-time faculty may hold doctorates other than the Ph.D. or D.Sc. This survey is expected to provide the basis for comparison with a similar survey carried out in 1968 and should reflect overall faculty research activity. Thus, there is a need not only for information on numbers of Ph.D.'s and D.Sc.'s but also on faculty with other doctorates. Consequently, we ask that for questions 1, 2, and 3 you indicate in parentheses for each item concerning doctorate faculty the number with doctorates other than the Ph.D., or D.Sc., e.g., M.D., D.D.S., D.V.M.

The assumption made in question 6 of no change in total funds for research is for the purpose of this study only. No implications as to the future amount of research funds are intended.

If additional space is needed for explanations or comments, please attach an additional sheet of paper.

Definitions

Fiscal year (abbreviation FY) means the 12-month period beginning July 1 and ending the following June 30, e.g., FY 1974 is the period July 1, 1973 to June 30, 1974.

The term **tenured** should be interpreted as referring to faculty members who have completed a probationary period of service and hold permanent or continuous appointments.

Please Note

To avoid the impression that a response has been omitted inadvertently, please use **none, not applicable (or N.A.),** or other appropriate notations to assist in the interpretation of replies.

Please use the reverse of the questionnaire pages (with identifying question numbers) to extend remarks.

O.M.B. Number 099S 74005
Approval Expires June 1975
Date of Approval: 3/26/74

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

SURVEY OF FACULTY RESEARCH ACTIVITIES, SPRING 1974

Institution (name and location)

Department

Name and title of person to contact about this survey

Address and telephone number of the person named above

( ) *Please check this item if this department is part of a medical school.*

1. How many regular full-time faculty members hold appointments in your department at the present time? How many of these faculty are tenured? How many are nontenured? Please enter the totals and numbers according to length of time since doctorate (e.g., include those whose doctorates were granted after July 1, 1967, under "7 years or less"). See Instructions regarding inclusions, exclusions, and use of parentheses for reporting faculty holding doctorates other than the Ph.D. or D.Sc.

	Total	Number of doctorates by years since award		Number without doctorate
		7 years or less	More than 7 years	
a. Total regular full-time faculty (sum of lines b and c)	=	( )+	( )+	
b. Tenured	=	( )+	( )+	
c. Nontenured	=	( )+	( )+	

2. How many of the regular full-time faculty members in your department (as reported in item 1.a. above) spend 20 percent or more of their time in research activities? (Calendar year basis.) How many of these faculty are tenured? How many are nontenured?

	Total	Number of doctorates by years since award		Number without doctorate
		7 years or less	More than 7 years	
a. Total regular full-time faculty spending 20 percent or more of time on research (sum of lines b and c) ..	=	( )+	( )+	
b. Tenured	=	( )+	( )+	
c. Nontenured	=	( )+	( )+	

3. How many of the regular full-time faculty
least 20 percent of their time on research
research directly connected with ,roject
agencies?

Total	Number of doctorates by year since award		Number without doctorate
	7 years or less	More than 7 years	
=	( )+	( )+	

4. Please estimate the proportion of **all** re
department in the current fiscal year (i.e.,
other than Federal research project funds.

Le

Please answer questions 5 through 9 on
doctorates.

5a. Taking into account **all** the research fu
department in the current fiscal year,
"young" faculty (7 years or less since doct

b. Considering all the research funds avail
current fiscal year, is there, in your op
available to "young" faculty (7 years or
(more than 7 years since doctorate)?

Ye

(1) If "no," which group do you consider to
"Young" fac

O.M.B. Number 099S 74005
Approval Expires June 1975
Date of Approval: 3/26/74

ENCE FOUNDATION
ion, D.C. 20550

ARCH ACTIVITIES, SPRING 1974

ned above

ent is part of a medical school.

embers hold appointments in your department faculty are tenured? How many are nontenured? according to length of time since doctorate es were granted after July 1, 1967, under regarding inclusions, exclusions, and use holding doctorates other than the Ph.D. or

Total	Number of doctorates by years since award		Number without doctorate
	7 years or less	More than 7 years	
=	( )+	( )+	
=	( )+	( )+	
=	( )+	( )+	

ulty members in your department (as reported or more of their time in research activities? faculty are tenured? How many are nontenured?

Total	Number of doctorates by years since award		Number without doctorate
	7 years or less	More than 7 years	
=	( )+	( )+	
=	( )+	( )+	
=	( )+	( )+	

3. How many of the regular full-time faculty members in your department spending at least 20 percent of their time on research (as reported in item 2.a. above) are doing research directly connected with **project grants and contracts awarded by Federal agencies?**

Total	Number of doctorates by year since award		Number without doctorate
	7 years or less	More than 7 years	
=	( )+	( )+	

4. Please estimate the proportion of **all** research funds available to faculty of your department in the current fiscal year (i.e., July 1, 1973–June 30, 1974) coming from **other than Federal research project funds.** (Check one.)

Less than 10% ☐ (1)
10 - 29% ☐(2)
30 - 49% ☐ (3)
50% or more ☐ (4)

Please answer questions 5 through 9 only for regular full-time faculty with earned doctorates.

5a. Taking into account **all** the research funds available to faculty members in your department in the current fiscal year, please estimate the proportion going to "young" faculty (7 years or less since doctorate). (Check one.)

None ☐ (1)
1% to 24% ☐ (2)
25% to 49% ☐ (3)
50% to 74% ☐ (4)
75% to 100% ☐ (5)

b. Considering all the research funds available to faculty in your department in the current fiscal year, is there, in your opinion, **an appropriate split between funds available to "young" faculty** (7 years or less since doctorate) **and "senior" faculty** (more than 7 years since doctorate)?

Yes ☐ (1) No ☐ (2)

(1) If "no," which group do you consider to be at a disadvantage?

"Young" faculty ☐ (1) "Senior" faculty ☐ (2)

6. If your answer to 5.b. is "no," please complete the following:

a. What would you consider to be an appropriate proportion of funds for "young" faculty (7 years or less since doctorate) in your department?

________%

b. For purposes of this question, please assume that the total amount of Federal research funds available to members of your department would remain constant. Under these circumstances, would you then favor the creation of special Federal research support programs specifically limited to faculty in either the "young" or "senior" group? (Check one.)

Yes, for "young" group only ☐ (1)
Yes, for "senior" group only ☐ (2)
No ☐ (3)

(1) If "yes" for either of the above, do you think it important that some of the support provided through these programs be earmarked for special equipment?

Yes ☐ (1) No ☐ (2)

7a. During the past 12 months, in your opinion, have the regular full-time faculty in your department who are spending at least 20 percent of their time doing research generally been able to receive support in research areas of their own choosing? (Answer both parts.)

"Young" faculty
Yes ☐ (1) No ☐ (2)

"Senior" faculty
Yes ☐ (3) No ☐ (4)

b. If "no" for either:

(1) What percentage of the above faculty members have been unable to secure support in research areas of their own choosing during the past 12 months? (Answer both parts if applicable.)

"Young" faculty ____%(1) "Senior" faculty ____%(2)

(2) Do you consider this to be a major problem? (Answer both parts if applicable.)

"Young" faculty
Yes ☐ (1) No ☐ (2)

"Senior" faculty
Yes ☐ (3) No ☐ (4)

8. How many of your full-time faculty m
their time on research have also pa
past 12 months? (Answer all that appl

a. Research project in industrial labora
b. Research project in government lab

9a. Have regular full-time faculty in your
lesser, or about the same proportion
FY 1974 **as compared with FY 1970?** (A

Greater by 10% or more in FY 197
Lesser by 10% or more in FY 1974
About the same (i.e., less than
10% change) ....

b. If a greater or lesser proportion of t
primarily from changes in Federal fund

"Young" faculty"
Yes ☐ (1) No ☐ (2)

"Senior" faculty
Yes ☐ (3) No ☐ (4)

c. If "no" for either, please indicate th
both parts if applicable).

Change in non-Federal funding ...
Change in number of teaching
assistants ....
Administrative or legislative decisio
requiring standard teaching load
Other, specify

se complete the following:
an appropriate proportion of funds for "young"
ctorate) in your department?

______%

lease assume that the total amount of Federal
nbers of your department would remain constant.
uld you then favor the creation of special Federal
cifically limited to faculty in either the "young" or

Yes, for "young" group only ☐ (1)
Yes, for "senior" group only ☐ (2)
No ☐ (3)

do you think it important that some of the
programs be earmarked for special equipment?

Yes ☐ (1) No ☐ (2)

your opinion, have the regular full-time faculty
ing at least 20 percent of their time doing research
port in research areas of their own choosing?

aculty members have been unable to secure support
choosing during the past 12 months? (Answer both

ng" faculty ____%(1) "Senior" faculty ____%(2)

major problem? (Answer both parts if applicable.)

8. How many of your full-time faculty members who are spending at least 20 percent of their time on research have also participated in the following activities during the past 12 months? (Answer all that apply.)

	"Young" faculty	"Senior" faculty
a. Research project in industrial laboratory:	____(1)	____(2)
b. Research project in government laboratory:	____(1)	____(2)

9a. Have regular full-time faculty in your department spent on the average a greater, a lesser, or about the same proportion of their time engaged in classroom teaching in FY 1974 **as compared with FY 1970?** (Answer both parts.)

	"Young" faculty	"Senior" faculty
Greater by 10% or more in FY 1974	☐(1)	☐(2)
Lesser by 10% or more in FY 1974	☐(3)	☐(4)
About the same (i.e., less than 10% change)	☐(5)	☐(6)

b. If a greater or lesser proportion of time is indicated in (a), did this change result **primarily from changes in Federal funding?** (Answer both parts if applicable.)

"Young"
faculty"

Yes ☐ (1) No ☐ (2)

"Senior"
faculty

Yes ☐ (3) No ☐ (4)

c. If "no" for either, please indicate the principal reasons for the change (answer both parts if applicable).

	"Young" faculty	"Senior" faculty
Change in non-Federal funding	☐(1)	☐(2)
Change in number of teaching assistants	☐(3)	☐(4)
Administrative or legislative decision requiring standard teaching load	☐(5)	☐(6)
Other, specify		

Other Science Resources Publications

REPORTS	NSF No.	Price
Research and Development in State Government Agencies, Fiscal Years 1972 and 1973	75-304	In press
Projections of Science & Engineering Doctorate Supply & Utilization, 1980 and 1985	75-301	$1.30
Detailed Statistical Tables, Manpower Resources for Scientific Activities at Universities and Colleges, January 1974	75-300-A	—
Federal Funds for Research, Development, and Other Scientific Activities, Fiscal Years 1973, 1974, and 1975, Vol. XXIII	74-320	$1.70
Detailed Statistical Tables, Federal Funds for Research, Development, and Other Scientific Activities, Fiscal Years 1973, 1974, and 1975, Vol. XXIII	74-320-A	—
Reviews of Data on Science Resources, No. 22, "The Federal Role in the Support of Graduate Science and Engineering Education"	74-317	$0.25
An Analysis of Federal R&D Funding by Function, Fiscal Years 1969-1975	74-313	$2.25
Research and Development in Industry, 1972	74-312	$2.05
National Patterns of R&D Resources. Funds & Manpower in the United States, 1953-1974	74-304	$1.00
Immigrant Scientists and Engineers in the United States. A Study of Characteristics and Attitudes	73-302	$2.50

Resources for Scientific Activities at Unive
ties and Colleges, 1971 ....

A Price Index for Deflation of Academic R
Expenditures ....

Scientific Human Resources: Profiles and
Issues ....

Unemployment Rates and Employment Ch
for Scientists and Engineers, 1971 ....

Papers and Proceedings of a Colloquium o
Development and Economic Growth/Pr

HIGHLIGHTS

"20-Percent Increase in Energy Activity Pa
Industrial R&D Spending in 1973" ....

"Federal Scientific and Technical Personne
Decline in 1973" ....

"Employment of Life Scientists Up in 1974
Accounts for Nearly All Growth of Scie
and Engineers in Doctorate-Granting Ins
tions" ....

"R&D Expenditures of Independent Nonp
tions Approach $1 Billion in 1973" ....

"Immigration of Scientists and Engineers D
Sharply in FY 1973; Physician Inflow Sti
Near FY 1972 Peak" ....

"Selected Characteristics of Five Engineeri
and Scientific Occupational Groups, 197

"NSF Forecasts Rise in Company-Funded
and Development and R&D Employmen

"Total Scientific and Technical Personnel i
Industry Remains Level, R&D Personnel
in 1970" ....

e Resources Publications

	NSF No.	Price
overnment 3	75-304	In press
Doctorate	75-301	$1.30
Resources s and	75-300-A	—
ent, and Other 3, 1974,	74-320	$1.70
ds for Scientific nd 1975,	74-320-A	—
, No. 22, Graduate	74-317	$0.25
y Function,	74-313	$2.25
1972	74-312	$2.05
unds & -1974	74-304	$1.00
ne United d	73-302	$2.50

Resources for Scientific Activities at Universities and Colleges, 1971	72-315	$1.95
A Price Index for Deflation of Academic R&D Expenditures	72-310	$0.25
Scientific Human Resources: Profiles and Issues	72-304	$0.25
Unemployment Rates and Employment Characteristics for Scientists and Engineers, 1971	72-307	$1.75
Papers and Proceedings of a Colloquium on Research and Development and Economic Growth/Productivity	72-303	$.75

HIGHLIGHTS

"20-Percent Increase in Energy Activity Paces Industrial R&D Spending in 1973"	74-319	—
"Federal Scientific and Technical Personnel Decline in 1973"	74-316	—
"Employment of Life Scientists Up in 1974—Accounts for Nearly All Growth of Scientists and Engineers in Doctorate-Granting Institutions"	74-315	—
"R&D Expenditures of Independent Nonprofit Institutions Approach $1 Billion in 1973"	74-309	—
"Immigration of Scientists and Engineers Drops Sharply in FY 1973; Physician Inflow Still Near FY 1972 Peak"	74-302	—
"Selected Characteristics of Five Engineering and Scientific Occupational Groups, 1972"	73-306	—
"NSF Forecasts Rise in Company-Funded Research and Development and R&D Employment"	73-301	—
"Total Scientific and Technical Personnel in Industry Remains Level, R&D Personnel Lower in 1970"	72-306	—

National Science Foundation
Washington, D.C. 20550

Official Business
PENALTY FOR PRIVATE USE, $300

Postage and Fees Paid
National Science Foundation

U.S.MAIL

THIRD CLASS
Bulk Rate